Henry B. Ward

THE Journal of Tropical Medicine

A BI-MONTHLY JOURNAL DEVOTED TO MEDICAL, SURGICAL AND GYNÆCOLOGICAL WORK IN THE TROPICS

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Original Communications.

A PRELIMINARY NOTE ON THE PRESENCE OF LIVING ADULT BILHARZIA WORMS IN BILHARZIAL PAPILLOMATA AND IN BILHARZIAL FIBROUS TISSUE.

By FRANK COLE MADDEN, M.B., B.S.Melb., F.R.C.S.Eng.

Professor of Surgery, Egyptian Government School of Medicine; Senior Surgeon, Kasr-el-Ainy Hospital, Cairo.

MY object in publishing this short note is to draw attention to a point in the pathology of new growths produced by bilharzia, which has not, I believe, been hitherto recorded. The diagnosis of the bilharzial nature of papillomata and fibrous tissue, and of bilharzial new growth generally, has usually been confirmed by the discovery of the characteristic *ova* in the section; but so far as the meagre literature at my disposal helps me, there has never been any mention of the presence of the living adult bilharzia *worm* in the new tissue. In a short paper on the "Surgical Aspects of Bilharzia of the Rectum," in *L'Egypte Médicale*, of February 15th, 1902, I prefaced my remarks by mentioning that "during the last few months my interest in the pathology of bilharzia of the rectum has been considerably increased by the discovery, on two occasions, of living bilharzia worms in pieces of papillomatous growth removed by operation." Since that date I have demonstrated the living worms in four other cases, not only in papillomata, but also in the hard white fibrous tissue resulting from the presence of bilharzia in the subcutaneous tissues.

The first case of the series was a rectal papilloma, on removing which I made a section of it with a scalpel and found a number of fine dark threads lying in the substance of the tumour. Picking these out on the point of a needle it was at once apparent that they were living worms, and Professor Looss had no hesitation in declaring them to be adult male bilharzia. They appeared to lie in open spaces in the fibrous tissue of the core of the papilloma; and in other parts of the tumour they were seen just beneath the thinned mucous membrane covering the growth, and easily visible from the mucous surface. On exposing the cut section to the air other worms appeared and could be seen in active movement as they made their way out of the mass on to the surface of the section.

Later Professor Looss was able to clear a piece of growth entirely by placing it in a watery saline solution, into which the worms made their way, and a microscopic section showed that the tissue, though presenting the characteristic appearances of bilharzia new growth, contained no worms; though it was full of ova, many of which were approaching the surface in the intervals between the follicles of the mucous membrane. Other sections not exposed to the action of the saline solution contained the worms *in situ* in the tumour. These phenomena were equally well seen in a second case of papilloma of the rectum, and I have also discovered them recently in papillomata of the vagina and of the posterior lip of the cervix uteri. Fortunately Professor Symmers has been able to mount these specimens by the glycero-formol method for the Pathological Museum, and two worms are seen half protruded from the cut section of the pedicle of the tumour.

Perhaps the most interesting cases, however, were those of chronic bilharzial urinary fistula, from which I cut away large pieces of thick fibrous tissue and discovered the worms in their substance. It would thus appear that living bilharzia worms may be distributed far more widely throughout the body than was formerly supposed; and now that one's attention has been drawn to their frequent presence in new growth, it is probable that on more careful examination living worms will be found in a very large proportion of such cases. My predecessor, Dr. Herbert Milton, is of opinion that each individual manifestation of bilharzia is largely local in origin, and the cases I refer to here certainly strengthen this idea.

It seems likely that there is a constant breeding of the worm, through the stages of adult worm, ova, embryo to adult worm again, going on indefinitely at the site of a bilharzial growth, and though accidentally, further supplies of worms may arrive from the portal vein, the tumour can get on very well without them, as it is entirely self-supporting and is constantly increasing its population on its own account. It must be admitted, however, that this theory can only hold good if the view that once bilharzia has entered the human body it is able to complete the cycle of life-changes entirely within the body and quite independent of any intermediate host is adopted. Recent work certainly seems to point in this direction, but I am not yet at liberty to make any more definite statement on this subject until further researches have been carried out.

The diagnosis of bilharzial tumours will thus become more and more easy if we can find *naked-eye* evidence of worms in the new growths in addition to the easily demonstrated presence of the ova by microscopical examination of a small fragment.

CASE OF LEPROSY AT WEI-HAI-WEI, SHANTUNG PROVINCE, CHINA.

Reported by V. Gunson Thorpe.

Staff-Surgeon, R.N.

The fact that a case of leprosy has been seen at Wei-hai-Wei confirms the somewhat meagre reports to hand concerning the prevalence of leprosy in the Shantung Province. It is customary in text-books on medicine to state that the whole of China is infected with the disease. The fallacy of this statement was demonstrated by Mr. Cantlie in his report on the conditions under which leprosy occurs in China.[1] In that report leprosy is shown to be very prevalent along the south-east coast of China in the provinces of Kwantung and Fokien, but it is only occasionally met with elsewhere in China, except in isolated patches along the valley of the Yangtze-kiang and a small area of the Shantung Province in which Wei-hai-wei is included. At Cheefoo, in the immediate vicinity of Wei-hai-wei, lepers are occasionally seen; but the district chiefly infected by leprosy in Shantung is inland and at a considerable distance from the coast, and it is only at times that the lepers travel as far as the coast.

South of this infected district China is free of leprosy for at least a thousand miles, and northwards leprosy is unknown. In all probability, therefore, this part of China has become infected from Korea or Japan.

The photograph which accompanies this report is that of a Chinese boy who came under Surgeon Thorpe's notice about the end of 1901. The case was apparently of a mixed type. As will be seen from the photograph, *main en griffe* was fairly well marked in both hands, but more especially in the right. The right foot was swollen and the second toe was markedly shorter than the third. There was pronounced nodular infiltration of the forehead. A skiagram of the foot showed a process of absorption in the terminal phalanx, no doubt accounting for its deficiency in length. A similar absorptive process also appeared to be commencing in the third and fourth toes. A skiagram of the hand, showing epiphyses, fails to demonstrate any absorptive process of the bones, but the flexure of the fingers due to leprotic changes is manifest. Owing to the disappearance of the lad immediately after the photograph and skiagram were taken, it was impossible to follow up the subsequent history of the case.

[1] Prize Essay on "The Conditions under which Leprosy occurs in China, Indo-China, Malaya, the Archipelago, and Oceania," compiled chiefly during 1891, by James Cantlie, F.R.C.S.

NEW OBSERVATIONS ON THE LARVÆ OF ANOPHELES AND CULEX IN THE WINTER.

(*Translated for the Authors by P. Falcke.*)

By Prof. Bruno Galli-Valerio and Dr. G. Rochaz.

The Hygienic-parasitological Institute of the University of Lausanne.

In the *Centralb. f. Bakt., &c.*, vol. xxix.,[1] one of us, assisted by Mr. Narbel, gave an account of the observations that had been made by us respecting the hibernation of the larvæ of *Anopheles* and *Culex* during the winter of 1900-1901.

No new contribution has been made to this question since the publication of our work. Even Nuttall and Shipley, in their interesting work on the "Biology of the *Anopheles*,"[2] confine themselves to the statement that they have kept larvæ of *A. bifurcatus* in the laboratory throughout the winter, and Grassi, in the second edition of his work on malaria,[3] only says that larvæ of *A. bifurcatus* may be found in Italy during the winter. It is also curious that Giles,[4] in the second edition of his excellent work, writes as follows: "In Northern Europe all larvæ and pupæ that may not be ripe for their remaining metamorphoses perish during the winter, but in Italy, according to Celli, the larvæ of *Anopheles* hibernate."

During the winter of 1901-2 we continued our observations on the survival during the winter of the larval form of the *Culicidæ*. In addition to some researches made here and there in the province of Waadt, we thought it important to keep under observation a certain pond from the month of October to the month of May, in order to be able to confirm the possible successive modifications that the larvæ of the *Culicidæ* might undergo during this period. We chose a pond in the plain of Orbe (Canton of Waadt), in 46° 43′ and 46° 44′ north latitude and at an altitude of 442 metres above sea-level. It was a pond standing alone and containing a rich growth of carex, more especially on its banks; during the summer and autumn numerous larvæ of *A. bifurcatus* and *A. maculipennis* had been found in this pond.

In the following table we give the results of the observations frequently made in this pond, and also add a few observations made in ponds in the vicinity.

PONDS UNDER OBSERVATION FROM OCTOBER 27, 1901, TO MAY 26, 1902.

Date	Temperature of Water	Temperature of Air	Results of Investigations	Observations
October 27, 1901 ..	+ 9° ..	—	Numerous medium-sized and small larvæ of *Anopheles*	—
November 3 ,, ..	+ 8° .. (4	+ 7° .. p.m.)	Numerous very small and medium-sized larvæ of *Anopheles*	—
,, 9 ,, ..	+ 4½° .. (4	+ 7° .. p.m.)	Numerous larvæ of *Anopheles* ..	A few of these larvæ were placed in a solution of dry hemp on November 12th. On the 9th of December, two pupæ (temperature of room + 8°) had formed, and two *A. bifurcatus*, ♂, developed therefrom on December 17th. Another pupa formed on December 1st, two nymphæ on December 21st and one on December 24th (temperature of room + 11°). On December 28th one ♀ of *A. bifurcatus* developed. On December 30th a seventh pupa formed, and on the 31st two ♂ of *A. bifurcatus* developed.
,, 15 ,, ..	+ 7° .. (3	+ 7° .. p.m.)	Numerous larvæ of *Anopheles* ..	Twenty pupæ of *Culex* (*C. annulatus*), large larvæ of *Culex*, and larvæ of *Anopheles* are found in a pond in the vicinity.
,, 22 ,, ..	+ 6° .. (10	+ 6° .. a.m.)	Numerous larvæ of *Anopheles* ..	A few larvæ of *Anopheles* are found in a pond in the vicinity. In another pond two nymphæ of *Culex* are found, which on December 27th developed into *C. annulatus*.
,, 29 ,, ..	+ 4½° .. (10 Sheet of to 4 c.cm. ness	+ 3° .. a.m.) ice from ½ in thick-	Larvæ of *Anopheles* fairly frequent; a few of *Culex*. The larvæ are not lively, and have sought shelter in the carex, where ice has formed latest	The other ponds of the vicinity are covered with a sheet of ice from 3 to 4 cm. in thickness.
December 7 ,, ..	+ 1½° .. (10 Sheet of to 6 cm. ness	+ 1½° .. a.m.) ice from 3 in thick-	No larvæ of *Anopheles* beneath the thick ice, although ten or twelve holes are cut in the ice; four larvæ of *Anopheles* found among the carex	—
,, 19 ,, ..	+ 2° .. (4 Ice 1-5 c	+ 3° .. p.m.) m. thick	Several larvæ of *Anopheles* and *Culex*	—
,, 28 ,, ..	+ 1½° .. (10	+ 1° .. a.m.)	Five larvæ of *Anopheles* and one of *Culex* found in carex	Numerous and large larvæ of *Culex* found in a pond in the vicinity.
January 3, 1902 ..	+ 1½ .. (3	+ 1½° .. p.m.)	Larvæ of *Anopheles* and one larva of *Culex* in the carex	Under a thick sheet of ice in the other pools numerous very small larvæ of *Culex* are found. They are most frequent in a puddle which had been dry from December 1st to January 1st, and had then filled with snow water when the warm temperature of the first days of January had melted the snow.
,, 24 ,, ..	+ 2° .. (3 Sheet of thick	+ 9° .. p.m.) ice 1-3 cm.	Numerous larvæ of *Anopheles* and a few *Culex*	—
,, 26 ,, ..	+ 3° .. (10 No mo	— a.m.) re ice	Numerous larvæ of *Anopheles*	—
February 8 ,, ..	+ 4½° ... (10 Hardly a a great de	+ 9° .. a.m.) ny ice but al of water	Numerous large larvæ of *Anopheles* in the carex	—
,, 23 ,, ..	—	—	—	In a fishpond near Agiez (528 m.), by Orbe, several small and medium-sized larvæ of *Anopheles* were found under a thin sheet of ice, mostly amongst the rushes and carex. Temperature of water + 4°.
,, 24 ,, ..	+ 7° .. (2	+ 4° .. p.m.)	Numerous larvæ of *Anopheles* and *Culex*	A few medium-sized and a few very large larvæ of *Culex* in the pools of the neighbourhood. Mixed with these a generation of small, hardly visible larvæ of *Culex*, also a few larvæ of *Anopheles*.
March 6 ,, ..	+ 11° .. (2	+ 8° .. p.m.)	Numerous large larvæ of *Anopheles* in the carex	Numerous larvæ of *Culex* of all sizes, and many larvæ of *Anopheles*, small and medium-sized, in the pools of the vicinity.
,, 9 ,, ..	+ 10° .. (4	— p.m.)	Many larvæ of *Anopheles*	The swamps near Bavois (445 m.), in the plain of Orbe, contained a number of larvæ of *Anopheles* and *Culex*. In the swamps of Villars, however, only very large and very small larvæ of *Culex*.

PONDS UNDER OBSERVATION FROM OCTOBER 27, 1901, TO MAY 26, 1902—(*Continued*).

Date	Temperature of Water	Temperature of Air	Results of Investigations	Observations
March 13, 1902 ..	–	—	—	—
,, 16 ,, ..	+ 5° .. (10	+ 5° .. a.m.)	Many larvæ of *Anopheles* and *Culex*	In a few pools near Pré Motthey, in the plain of Orbe, numerous larvæ of *Culex*, but no *Anopheles*. In one swamp of l'Abergement (642 m.), with atmospheric temperature of + 9° and water temperature of + 10°, many large and very small larvæ of *Culex*.
,, 20 ,, ..	+ 11½° .. (3	+ 14½° .. p.m.)	A number of large, medium-sized and small larvæ of *Anopheles*	The first pupæ of the larvæ collected on March 9th forms. In a house near Orbe 5 full-grown *C. annulatus*, which were fluttering about room, were caught.
,, 22 ,, ..	—	+ 5° ..	—	Two pupæ from the larvæ of *Anopheles*, collected at Bavois on March 13th, formed.
,, 25 ,, ..	—	+ 2½° ..	—	Five pupæ form from the larvæ of *Anopheles* gathered at Bavois on March 13th, as also a pupa of *Culex* from larvæ of *Culex* gathered the same day.
,, 26 ,, ..	+ 9° .. (3	+ 6° .. p.m.)	Many larvæ of *Anopheles* and a few of *Culex* in the carex	There are a few larvæ of *Anopheles*, very small, in the puddles of the vicinity; numerous large larvæ of *Culex*; one generation of very small larvæ of *Culex*.
April 2 ,, ..	+ 7° ..	+ 10° ..	Several pupæ; many larvæ of *Anopheles*	A ♂ of *A. bifurcatus* from the larvæ of *Anopheles* of March 9th developed. Numerous pupæ in all the vessels in which larvæ had been collected during winter.
,, 4 ,, ..	—	—	—	Larvæ of *Anopheles* and numerous pupæ in the marshes of Bavois (445 m.). No larvæ of *Anopheles* in the marshes of Villars (442 m.), but very large and numerous larvæ of *Culex*.
,, 5 ,, ..	+ 12° .. (3	+ 10° .. p.m.)	Numerous larvæ and pupæ of *Anopheles* in the carex	Many larvæ of *Anopheles* and *Culex* in the pools of the neighbourhood. One larvæ of *Anopheles* measuring 1½ mm. appears just to have emerged.
,, 6 ,, ..	—	+ 10° ..	—	From the larvæ collected on March 20th two ♀ *A. bifurcatus* have developed, and from those collected on March 13th five ♂ and one ♀ of *A. bifurcatus* have developed.
,, 7 ,, ..	—	—	—	The larvæ of March 20th yield one ♂ and one ♀ of *A. bifurcatus*.
,, 8 ,, ..	—	—	—	In a marsh between Montcherand and Valeyres (570 m.) numerous larvæ of *Culex* and *Mochlony* are found. The larvæ of March 20th yield one ♀ and those of March 13th two ♂ of *A. bifurcatus*.
,, 9 ,, ..	+ 11° .. (3	+ 13° .. p.m.	Numerous larvæ and pupæ of *Anopheles*	In a pool close by there are tiny larvæ of *Anopheles*, probably a new generation; pupæ and small larvæ of *Culex* are to be seen everywhere. Development of a ♀ of *Culex* and several *A. bifurcatus* from the larvæ collected in winter.
,, 10 ,, ..	—	+ 12° ..	—	A ♀ of *A. bifurcatus* developed from the larvæ collected on March 9th.
,, 12 ,, ..	+ 12° .. (4	p.m.)	Many larvæ and pupæ of *Anopheles*; several very small larvæ of *Anopheles*	—
,, 18 ,, ..	+ 13° ..	—	—	Numerous larvæ and pupæ of *Anopheles* (*A. bifurcatus*) in the marsh of Boven (588 m.), two larvæ of *Culex*.
,, 19 ,, ..	+ 12 .. (3	— p.m.)	Larvæ and nymphæ of *Anopheles* less numerous	Many full-grown *Culices* in the vicinity of the pools placed under observation.
,, 21 ,, ..	+ 14 .. (4	— p.m.)	Only a few larvæ of *Anopheles* and *Culex*. Pupæ very numerous	In the other puddles only a few larvæ but a great many pupæ. Many full-grown *Culicidæ* in the vicinity.
,, 25 ,, ..	–	+ 11° ..	—	The larvæ collected on November 3rd develop into *A. bifurcatus*.
May 18 ,, ..	—	—	A few large larvæ of *Anopheles* of a greenish colour	—
,, 26 ,, ..	—	+ 15° ..	—	*A. maculipennis* ♀ obtained from the larvæ collected on May 18th.
June 14 ,, ..	—	+ 11° ..	—	A very small ♀ of *Anopheles*, which exhibits the character of *A. nigripes* (?) obtained from the larvæ collected on March 9th.

The average temperature in Orbe during this period was as follows:—

November ..	+ 2·46° C.	February ..	− 0·98° C.
December ..	+ 1·33°	March ..	+ 4·67°
January ..	− 0·95°	April	+ 9·9°

Some observations were also made in other marshes of the Canton of Waadt during the winter of 1901-1902 with the following results.

Marshes on the Bank of the Lake of Geneva near Vidy (Lausanne), 375 Metres High.

From November 1st to the end of April larvæ of *Anopheles* as well as of *Culex* were always found in this marsh. The temperature of the water varies between + 10° and + 1°, and the pools were several times covered with a sheet of ice 4 to 8 cm. in thickness. On November 28th a pupa was still found in this marsh, the atmospheric temperature being 0° and temperature of the water + 1°. The sheet of ice was 4 cm. thick. The first pupæ appeared on March 27th, the temperature of the water being + 10°. The larvæ collected in this district during the winter yielded *A. bifurcatus*.

The average temperatures in Lausaune during this period were as follows:—

	Average	Maxima	Minima
November	+ 2·34° C.	+ 16·3°	− 5·0°
December	+ 1·3°	+ 8·3°	− 3·5°
January	+ 1·26°	+ 11·0°	− 4·5
February	+ 0·56°	+ 8·7°	− 7·5°
March	+ 4·92°	+ 15·9°	− 5·5°
April	+ 11·04°	+ 22·8°	+ 5·5°

Marshes near Villeneuve.

A few medium-sized larvæ of *Anopheles* and numerous large and small larvæ of *Culex* were found in a pool covered with thin ice on February 20th. Only a few larvæ and pupæ of *Anopheles* and *Culex* were found with an atmospheric temperature of + 12°. The larvæ which were collected on February 20th yielded *A. bifurcatus*.

All the above-mentioned observations entirely confirm those of previous years, namely, that the larvæ of *Anopheles*, like the larvæ of *Culex*, pass the winter in pools in great numbers, even when covered with ice. It is noteworthy, however, that, like the previous year, no *A. maculipennis* were yielded from the larvæ collected during the winter, although this species is very frequent in summer. On May 18th for the first time we found the first larvæ of *A. maculipennis* in the pools placed under observation over the winter. It appears to us that, just as Grassi asserts that in Italy the larvæ of *A. maculipennis* do not survive the winter, the same is the case in the Canton of Waadt: even if some do survive they must be very scarce.

Grassi's observations also confirm ours, that the larvæ that survive the winter during that time seek the shelter of the carex and rushes more than during the summer. In the midst of this vegetation they may be found in numbers, whereas, in the same pool, but in the open water, they are never or rarely met with.

It is also important to observe how the time of the appearance of the first pupæ and that of first full-grown culicidæ in 1902 almost tallied with their appearance in 1901; the first pupæ formed on March 26th (temperature of water + 9°, atmospheric temperature + 6°), (in 1901 this took place on April 1st, the temperature of the water being + 8·7°), and the first development of *A. bifurcatus* took place on April 2nd with an atmospheric temperature of + 10° (in 1901 on April 2nd with an atmospheric temperature of + 9·7°).

One very important fact is yielded by these our observations, namely, that the eggs of the *Culicidæ* appear capable of surviving the winter even if the soil dries up in the meantime. In one pool which was quite dry from December 1st to January 1st, and then suddenly filled with snow water, when the fallen snow melted with the warmer weather, numerous very small, hardly discernible larvæ of *Culex* were seen, as if they had just escaped from the egg. In this case the existence of the larvæ in the pool must be excluded, as it had been dry for over a month, as must also the penetration of larvæ from another pool, because, as already mentioned, this pool was quite isolated. The fact can be explained in two ways: these larvæ either originate from eggs which had been deposited by female *Culices* during the first days of January, or they originated from eggs which had been lain there since the autumn, *i.e.*, before the pool had become dry. The first hypothesis does not seem to be feasible, the pool being far distant from dwelling houses where adult *Culices* could winter most easily. Indeed the presence of adult *Culices* fluttering over the water in the first days of January was not confirmed. The second hypothesis appears more probable when some few facts are considered which prove the capability of resistance of the eggs to the effects of desiccation. Ross, in fact, placed *Anopheles'* eggs in a dry test-glass; five months later he added water, and larvæ developed from these eggs. Grassi and Noè had eggs of *Anopheles* lying dry in a test-glass for twelve days, and these produced larvæ. Carroll, Agramonte and Lazear[5] also cite the case of eggs of *Stegomyia fasciata* which developed after lying dry for thirty days in a dried-up pool.

The fact that in the early spring tiny larvæ of *Anopheles* and *Culex* are frequently seen in pools where they could not be discovered in winter, and at a period when no adult *Culicidæ* were to be seen in their vicinity, speaks for the hypothesis of the wintering of the eggs. This question, however, can only be cleared up by new investigations which confirm the degree of capacity of resistance of the eggs to low temperatures.

We have made investigations to test the capacity of resistance of eggs of *Culex* to the effects of various physical and mechanical agents, and we here briefly state a few results, which will be published *in extenso* later on:—

(1) Eggs of *Culex* in a vessel containing water were placed in a refrigerator and kept there for twenty-two hours; the temperature of the refrigerator was 0°, and of the water + 0·5°. After the eggs had been brought back to room temperature, and as soon as the water had risen to a temperature of 10°, they all hatched out. It may be mentioned that the temperature of the water

of the ice-covered marshes varied between 0·5, + 1, + 1·5°.

(2) Eggs were placed in a test-glass with water and then into a refrigerating mixture at 10.30 a.m. At 11.15 a.m. the temperature of the water was 0°, at 11.29 a.m. it was 1°, at 1.30 p.m. + 1°, at 6 p.m. it was + 2°. On the following morning at 8 the thermometer was + 15° and all the eggs had hatched.

(3) Eggs were placed on ice for forty-eight hours, then placed in water at room temperature; after forty-eight hours all the eggs were hatched.

(4) Eggs placed on damp blotting paper in a Petri dish on June 23rd at 8.30 hatched out on the morning of June 25th. At 10.30 a.m. on June 26th water was poured on the blotting paper and most of the young larvæ revived.

(5) Though eggs were placed in a dry test-glass they hatched out in a few hours.

(6) Eggs were placed in a test-glass dry for sixty-six hours in a cellar with a temperature of 7°. After these eggs had been placed in water they hatched after twenty-four hours.

(7) On June 23rd at 8.30 a little heap of eggs was placed in water which was kept in a state of agitation by means of a horizontal wheel. All the eggs sank to the bottom of the vessel at 10.30, and notwithstanding the continuous movement of the water they hatched out beneath the water at 5 p.m.

These statements seem to confirm the fact that the eggs possess great powers of resistance to the effects of various deteriorating factors.—(*Centralblatt f. Bakteriologie, Parasitenkunde u. Infektionskrankheiten.*)

REFERENCES.

[1] *Centralb. f. Bakt.,&c.*, part i. vol. xxix., 1901, p. 898.
[2] *Journ. of Hyg.*, 1901, p. 451.
[3] *Studi di uno zoologo sulla malaria*, Rome, 1901, 2nd edit.
[4] "Handbook of the Gnats or Mosquitoes," London, 1902, 2nd edit.
[5] *Phil. Med. Journ.*, 1900, p. 291.

PRESCRIPTIONS.

TÆNIA.—

℞ Oleoresin of male fern }
Chloroform } .... ½ oz.
Glycerin .... ℥ii—℥ss

M. Sig. One dose in the morning followed by an ounce of castor-oil.—J. C. PATTERSON.—*The Practitioner.*

A NEW TÆNIAFUGE.

The following prescription is stated to be a harmless and efficacious tæniafuge for adults:—

℞ Black copper oxide..................... 90 grains.
Calcium carbonate..................... 30 ,,
Levigated white bole.................. 180 ,,
Glycerin .... q. s.

M ft. pil. cxx. Two pills to be taken four times daily, avoiding acid foods. On the last day a dose of castor-oil should be taken. —*Giornale di farmacia, di chimica e di scienze affini*, 1902.

SOURCES OF CONTAGION IN LEPROSY. Gravagna (*Journ. des Mal. Cut. et Syph.*, January, 1902).

The author, having found Hansen's bacillus on the surface of leprous lesions, draws attention to the possibility of contagion through the medium of coins which have been handled by lepers. He states that he found the specific bacillus on gold coins in the possession of a leper.

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THE

Journal of Tropical Medicine

JANUARY 1, 1903.

ANNOUNCEMENT.

A PRIZE OF £10

(Constituting the Fourth Prize now offered in Competition),

Entitled "THE JOURNAL OF TROPICAL MEDICINE PRIZE," will be awarded for the best account of

Epiphytic Diseases of the Skin met with in the Tropics.

The Papers must be sent in by October 1st, 1903, to

THE EDITORS,
JOURNAL OF TROPICAL MEDICINE,
c/o MESSRS. JOHN BALE, SONS AND DANIELSSON, LTD.,
83-89, GT. TITCHFIELD STREET,
LONDON, W.

This Prize is to be competed for under conditions (announced in previous numbers) similar to those required for the Sivewright, Belilios, and MacGregor prizes.

The following have consented to act as judges in the competition:—

Lt.-Col. DAVID BRUCE, F.R.S., R.A.M.C.
JAMES GALLOWAY, M.D., F.R.C.S.,
Lecturer on Skin Diseases, London School of Tropical Medicine.

THE JOURNAL.

In 1898 the first number of the Journal of Tropical Medicine was issued, so that now the Journal enters upon its sixth volume. Since its commencement the extent and, we hope, the influence of the Journal has steadily increased, and there is every indication of continued prosperity. At first a monthly periodical; in January, 1901, it was found expedient to issue the Journal fortnightly, and if the literature of Tropical Medicine is to be sufficiently dealt with, it may be necessary in the near future to make it a weekly publication.

We are quite aware of our shortcomings; but to want of space is to be attributed the principal defects in constituting the Journal a thoroughly reliable mirror of Tropical Practice, and a record of all that appertains to Tropical Medicine.

We are fortunate in being able to announce an increased staff of co-operators and advisors in the work of publication. Dr. Louis Sambon has long been known as an earnest and enthusiastic worker and writer on matters appertaining to Tropical Medicine, and we have great pleasure in announcing that we have been fortunate enough to secure his co-operation in the editorial work of the Journal.

With an Advisory Committee consisting of such well-known and distinguished names as Dr. Alexander Crombie, C.B., Dr. Patrick Manson, C.M.G., and Major Ronald Ross, C.B., the Journal is fortunate indeed, and we may be now said to be issuing from the initial stage of our attempt, and entering upon a more mature career.

With such able assistance a fresh lease of usefulness lies before this Journal, and it will be our endeavour to focus the literature of Tropical Medicine, so that all students of the subject may find within its pages all that appertains to the wide range of tropical disease.

Prizes.

A second series of prizes was issued for competition in the autumn of 1902, and we have pleasure in announcing a fourth prize, entitled "The Journal of Tropical Medicine Prize," a New Year's gift from one who has rendered signal benefits to our Empire in one of our self-governing colonies, but who wishes the prize to be known as the "Journal of Tropical Medicine Prize." The subject chosen is of wide range and of important bearing. The title, "Epiphytic Diseases of the Skin met with in the Tropics," includes cutaneous diseases, not only of tropical origin, but also those common to temperate and tropical climates met with by practitioners in various countries. When illustrations, photographs, or microscopical specimens can be obtained they should be forwarded, with the detailed descriptions.

A certificate is to be issued, in addition to the monetary prize, to each successful competitor; and to such others as may be deemed worthy by the judges, a special certificate of merit will be granted.

MAJOR RONALD ROSS, C.B., F.R.S.

Our congratulations are due, and are cordially extended, to Major Ronald Ross on his having gained the Nobel Prize in medicine for the year 1902.

Major Ross's name has been so prominently before the scientific world for the past few years that nothing we can say can lend further lústre to a name which has become a household word, not only in this country but in almost every part of the world. How highly his work is thought of abroad receives testimony from the recommendation of the Royal Carolinska Institute of Medicine and Surgery in Stockholm when they recommended Major Ross for the award. The prize is stated to be worth between £8,000 and £10,000, and it is seldom scientific work receives so material a recognition. A short account of the career of this distinguished man will not be out of place here.

Major Ross was born in the year 1857. His father, General C. C. G. Ross, rendered valuable services to his country. In the year 1875 Major Ross commenced the study of medicine in London, at St. Bartholomew's Hospital, and shortly after finishing his career in London he entered the Indian service, and in 1881 went to India. In 1894, whilst in London, he became a convert to Manson's recently formulated mosquito-malaria theory. With what ardent enthusiasm, patient work and brilliant results Ross carried on the elucidation of this theory when he returned to India, is now known to the world, and it was only after two and a half years' close study, carried on in a thoroughly scientific spirit, Major Ross succeeded in demonstrating the life cycle of the parasites of malaria in mosquitoes.

In 1899 Major Ross returned to this country, and

shortly afterwards was appointed to the Liverpool School of Tropical Medicine. After a short residence in Liverpool, Major Ross, in conjunction with Dr. Annett and Mr. Austen, was sent to West Africa to continue his investigations, and whilst there succeeded in determining the species of mosquito which is responsible for the transmission of the deadly African

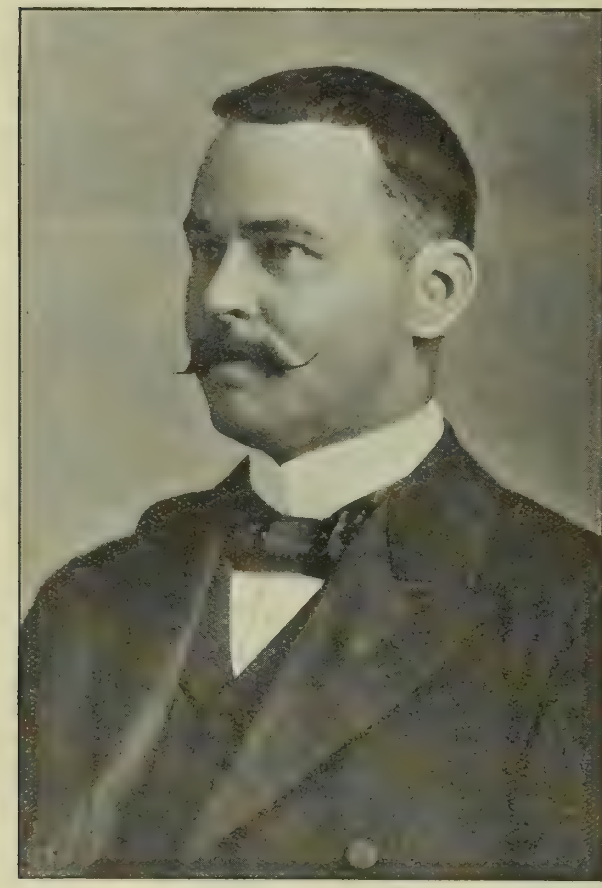

Photo by Elliot and Fry.

fever. Under the direction of Sir Alfred Jones the Liverpool School of Tropical Medicine has been instrumental in organising expeditions into various parts of the Tropics, and especially to West Africa, where organised attempts have been made to exterminate malaria. In 1901 Major Ross was elected a Fellow of the Royal Society of London; and in 1902 he was appointed a Companion of the most Honourable Order of the Bath.

Trypanosoma Hominis.—We gather from a short note in *Le Caducée*, Dec. 20th, 1902, that Dr. Le Moal, at Brazzaville, Congo Free State, found trypanosomes in the blood of an official who had left the Congo.

British Medical Association.

KALA-AZAR AS AN ANALOGOUS DISEASE TO MALTA FEVER.

Preliminary Notes of an Investigation and some Discoveries regarding the Nature of the Condition known as Kala-azar.

By Charles A. Bentley, M.B., C.M.Edin.

Medical Officer Empire of India and Ceylon Tea Company, Limited, Borjulie Tea Estate, Tezpore, Assam.

Kala-azar has for a number of years been one of the riddles of tropical medicine. There have probably been few diseases so frequently investigated during so short a period in which such varying conclusions have been arrived at by those who have been occupied with the work of investigation.

In 1900 Giles declared the disease to be the result of ankylostomiasis, either by itself, or in some cases complicated with a coincident malarial infection. A few years later Rogers was equally emphatic in his repudiation of the ankylostomal theory of origin. He states, after a lengthy discussion of the whole question: "The disease, then, is a very intense form of malarial fever."

Still more recently, Ross, in his exhaustive and interesting "Report upon the Nature of Kala-azar," appears to insist on the non-malarial nature of the second stage of the disease. It is true that he states, "I think, then, with Rogers, that kala-azar is malarial fever," but this statement is so qualified in the text that he is generally quoted as describing the condition to a peculiar form of post-malarial cachexia. Thus Manson, in his work on "Tropical Diseases," says:—

"Ross . . . considers that kala-azar and a similar condition called kala-dunkh are virtually forms of post-malarial cachexia akin to, if not identical with, similar conditions met with elsewhere in malarial countries."

I do not think that it can be said, however, that either of these conclusions have been accepted in their entirety of recent years by medical men who have had occasion to see much of the disease.

During the past eighteen months I have seen and treated some 400 cases of kala-azar, and I have had the opportunity of watching the gradual invasion of previously healthy coolie lines by an epidemic of this disease.

I have thus had ample material at my disposal for a study of the condition, both from a clinical and epidemiological standpoint. Many cases I have watched from the very beginning, having known them as healthy coolies previous to the contraction of the infection. The careful study of these cases has given me a fairly accurate knowledge of the cause of the disease, and the chief clinical features which present themselves to the observer during the various stages of the affection.

Since I began the study of the disease I have been gradually forced to the following conclusions, based upon the results of clinical, epidemiological, and microscopical observations:—

(1) Kala-azar is neither malarial fever, benign or malignant; nor is it any form of malarial cachexia or post-malarial cachexia. It may, however, be complicated by a coincident malarial infection.

(2) Kala-azar is a distinct disease, of which the first and second stages as described by Ross, in which an initial attack of irregularly intermittent, remittent or continued fever, followed by recurrences of a similar nature in the first stage, the second stage of nearly continuous fever of a low type, together constitute the whole of one febrile affection of long duration.

When reading up the available literature upon kala-azar, I was struck by the fact that very many of its earliest observers were reported as having expressed the opinion that the condition was either not malarial, or that it was something more than a malarial infection.

The following extracts from Rogers' report upon kala-azar are very strong evidence that the medical men therein quoted had not failed to note the wide divergences between kala-azar and malaria.

Dr. Warburton, Sanitary Commissioner in 1893, writes: " . . . its unequal incidence, where sanitary conditions appear equally bad, the gradual and steady progress downhill unaffected by treatment, the statement that it is slowly but steadily extending up the valley, seem to point to something more than malarial cachexia."

In the sanitary report for 1894, Dr. Stephen, who had succeeded Dr. Warburton, gives the following summary of the opinions of some of the civil surgeons who had seen the disease.

"Surgeon-Major Boruah is of opinion that kala-azar is something more than malarial cachexia.

"Surgeon-Major Campbell is under the impression that the disease is malarial fever, complicated in 75 to 80 per cent. of cases with ankylostomiasis. He, however, is not quite certain that some other cause does not come into play, as later in his letter he states that were a bacteriologist appointed to investigate the condition, he might discover it to be due to some micro-organism, differing from the *Plasmodium malariæ*.

"Mr. McNaught believes that it is a specific disease distinct from malarial fever.

"The medical officers of tea gardens who met at Kokilamukh on October 30th, 1894, after examining persons suffering from kala-azar, brought before them by Drs. Price and Lavertine, of Nowgong, came to the conclusion that the disease was distinct from malarial fever, as they remark that it appears to be entirely unknown in Upper Assam."

Surgeon-Colonel Stephen gives it as his opinion: "From what I have seen of the disease, and from what I have been told of it by those who have had the opportunity of studying it, I am under the impression that although allied to malarial fever, it is probably a separate disease; and as none of the remedies used seem to have had any effect in stopping its ravages, and as it is steadily spreading eastwards up the Assam Valley on both sides of the river, I would recommend that a specialist be appointed to inquire into its cause."

The idea, then, that kala-azar is a non-malarial fever is no new one. It appears that most of the observers whose opinions have been quoted based their doubts as to the malarial nature of the condition upon its well-known epidemic character, and the strong evidence of its communicability.

At that time no one, except perhaps Mr. McNaught, who has had most exceptional opportunities of studying the disease, appears to have questioned the clinical resemblance of kala-azar to ordinary paludism. Indeed, many men have insisted upon the extraordinary likeness which the clinical picture of the disease bore to the type of malarial fever common to the country. This mistake has been largely due to the confusion that has existed for so long regarding the various forms of malarial fever and other febrile affections, whether caused by the presence of the bacillus of Eberth or the *Micrococcus melitensis*.

It is only very recently that the great frequency of typhoid fever among the natives of India was definitely proved, and there still remain a certain number of medical men who doubt the truth of this conclusion on clinical grounds alone. The same may be said in regard to Malta fever, which is probably still regarded as an entirely foreign disease by the bulk of the practitioners of the older school resident in this country. It is only since 1897, when the occurrence of this latter disease in certain parts of India was definitely shown by Wright, Semple, Smith, and others, that medical men have begun to regard it as a possible factor in the causation of some of the atypical sub-continued fevers so common in many parts of India.

It is a matter of common knowledge that the terms "ague" and "remittent fever," still in general use in India as a nomenclature for malarial fevers of all types, have for many years covered a multitude of sins of omission in regard to the correct diagnosis of the febrile diseases prevalent in this country.

Fortunately, recent developments in hæmatology have placed a certain method of diagnosis in the hands of the medical man of the present day, and the result will be an almost complete reclassification of many tropical fevers previously differentiated by clinical features alone.

Quoting Marchiafava and Bignami, we can say: "Hence the progress now made lies essentially not in the increase in the number of pictures of malaria, but in the elimination, guided by the examination of the blood of all those forms which the insufficiency of means for diagnosis has led many authors, and leads even recent writers, to attribute to this infection." And again: "Those clinical types of sub-continued or remittent fever, as one may say, which deviate so far from the common forms of malarial fever in their course, and in their behaviour when treated with the salts of quinine, &c., as, for instance, the sub-continued fever described by Colin, the so-called typho-malarial fevers, Sternberg's adynamic remittent, many of Schellong's remittents, &c., these clinical forms no longer appear in the recent descriptions of those who have taken the examination of the blood as their sure guide."

As I hope to indicate later, the examination of the blood entirely negatives the assertion that malarial infection is the primary cause of kala-azar, but I am anxious first of all to show that on clinical grounds alone we are justified in denying to the malarial para-

site any active part in the production of this disease and its subsequent cachexia.

Clinical Picture of the Disease (Kala-azar).

The disease commences with an attack of high fever, which may be preceded by a rigor or chill, and in some cases vomiting. The fever may be very severe, and varies in type, being intermittent in a few cases, though more frequently remittent or subcontinued in character. It lasts for periods of from two to six weeks, and occasionally longer. During the fever, unless previous anæmia was marked, the spleen and then the liver become enlarged. The fever is followed by a period of apyrexia, during which time the patient appears to improve, but after an interval of varying length a recurrence of the fever takes place. No treatment has yet been successful in preventing these recurrences in the cases of the epidemic form of the disease. Quinine, although it certainly has some slight favourable action, has entirely failed to check the initial pyrexia or to prevent the recurrence of the fever, even when given in doses of 90 gr. in the twenty-four hours during the primary attack and continued throughout the apyrexial period. This has been my experience in a large number of cases. The second attack of fever remains for a more or less indefinite period, and is then followed by another disappearance of the fever, only of a temporary nature, however. Alternating attacks of fever and periods of comparative freedom from pyrexia may continue to take place until at last the patient becomes the subject of a low form of fever, rarely rising above 102°, but remaining persistent in spite of all treatment, often for many months at a time.

As the attacks of fever alluded to above recur, the patient becomes the subject of marked splenic and hepatic enlargement, and may experience considerable pain and tenderness over these organs. Rigors do not generally appear during these secondary attacks, but patients often complain of feeling chilly during the accession of fever. Profuse sweats may often be observed upon remission of the fever, and it is frequently only by the occurrence of these perspirations that a patient is enabled to tell whether he has been suffering from fever.

Pains and aching of the limbs and joints also frequently occur, and have often led to a diagnosis of "rheumatism" on the part of the native medical officers who may be called on to treat the case. Emaciation and anæmia of a mild grade soon becomes noticeable in the subjects of the disease, and, with the increase of the liver and spleen, cause the patient to present a typical appearance. At this stage the swollen abdomen, standing out in marked contrast to the skeleton-like limbs, together with the extraordinary earthy-grey colour of the skin, stamp the patient as the victim of some terribly chronic and debilitating affection. During this period of low fever, which to both patient and medical man often appears never-ending, many minor symptoms occasionally show themselves. Thus marked headache, usually frontal in character, a change in the character of the hair, which loses its pigment and becomes dry and brittle, or may almost wholly fall from the scalp, and the occasional appearance of petechial patches, chiefly about the axillæ, occur in a proportion of cases. Frequent epistaxis and hæmorrhages from the gums are also seen in some cases. The condition of constant low fever, associated with gradual emaciation, enlargement of the spleen, and anæmia, may continue for many months, until some improvement takes place or the patient is carried off by some intercurrent disease. Finally, however, a post-febrile stage may be reached in which the enlargement of the organs often disappears, but the emaciation and anæmia remain until, perhaps, very slowly recovery takes place. More often death results by dysentery, phthisis, pneumonia, or pure asthenia.

It may be remarked that the anæmia, though often severe, never reaches the degree usually seen in marked cases of so-called ankylostomiasis, unless the patient happen to suffer from a severe coincident infection by the ankylostoma.

Death may occur from a sudden access of high fever at any stage of the disease, but at least 90 per cent. of the mortality must be attributed to dysenteric complications, the remaining 10 per cent. resulting from the causes enumerated above.

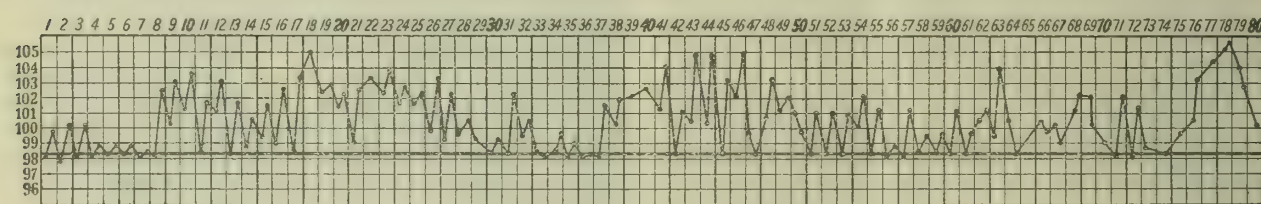

Chart of Early Stages of Kala-Azar.

Epidemiology.

Though the disease has only been described in epidemic form there is little doubt but that it occurs sporadically, and that mild forms of the infection are frequently seen. Medical men in parts of Assam, which are or have been subjected to an invasion of the epidemic, often have occasion to treat cases of obstinate fever, both in natives and Europeans, resisting ordinary doses of quinine, and lasting for periods of many weeks or months. These mild infections, however, are generally vaguely called "remittent fever," and the eventual recovery of the patient is quoted as proof conclusive that the affection was not kala-azar.

Ross, in his report, mentions cases of this nature occurring in Secunderabad, Bangalore, Sigur Ghat, and the Darjeeling Terai; and Captain W. H.

LEPROSY AT WEI-HAI-WEI, SHANTUNG, CHINA.

Illustrating the Article by V. Gunson Thorpe, Staff Surgeon, R.N.

Bale & Danielsson, Ltd

1 2 3 4 5 6 7 8 9 10

FIG. 1.—Photograph of ten boys, victims of kala-azar, taken in January, 1902. Six months later Nos. 3, 5, 6, 7, and 8 were dead. Out of about 25 boys of from 8 to 14, in a line of 350 coolies (total population), which had been extremely healthy until the invasion by kala-azar, some 18 or 19 took the disease, and some 50 per cent. of these succumbed to the infection. No. 10, although at one time nearly hopeless, has now recovered.

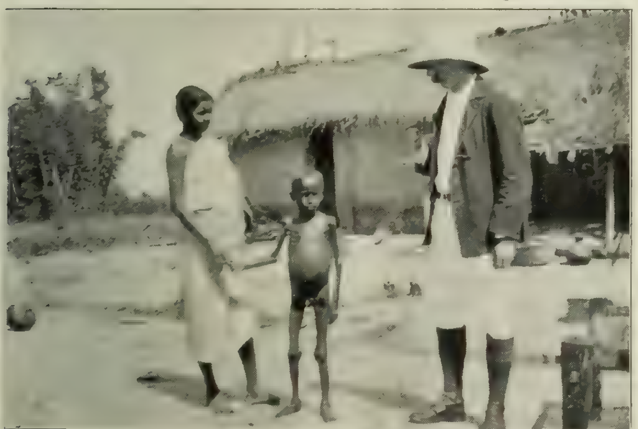

FIG. 3.—Another photograph of boy No. 10 in the large group (Fig. 1). Very typical case of severe second stage of kala-azar. General emaciation and marked abdominal enlargement, owing to increase in size of liver and spleen.

FIG. 4.—Case of kala-azar complicated with anæmia (ankylostomiasis, bad food, etc.). The patient shows facial œdema and swelling of the ankles, as well as marked emaciation.

FIG. 2.—Photograph of a girl of 14 in the second stage of kala-azar; showing general emaciation of limbs, &c.

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Horrocks, I.M.S., in an interesting paper read before the First Indian Medical Congress of 1894, gives an account of three cases of apparently similar character. He says: "The cases in which the symptoms of enteric (?) fever were associated with continued fever extending over many months are very interesting, and their exact pathology as yet cannot be determined, as they all recovered."

In the case of Lance-corporal H., fever continued for eighty-one days. During the first three weeks his condition strongly resembled an ordinary enteric case. Then the abdominal symptoms disappeared, and he suffered from rheumatic pains, chiefly in the hip joints. The bowels were obstinately constipated, and he gradually became extremely emaciated.

In Surgeon G.'s case the fever continued for sixty-four days. He suffered from abdominal distension, pain in the right iliac fossa, and epistaxis. The bowels were constipated, and the liver and spleen gradually became much enlarged.

In Private C.'s case the fever did not maintain a continued type throughout the disease, but seemed to come on in successive waves during a period of two hundred and fifty days. After the first three weeks he never showed any abdominal symptoms, but the liver and spleen gradually became much enlarged, and he suffered from rheumatic pains in the joints of the lower extremities.

Further on he continues: "In these three cases described, abdominal symptoms disappeared quite early in the disease, and enlargement of the liver and spleen, with rheumatic pains in the joints, were the marked symptoms. The men did not appear seriously ill, and their appearance was quite different from the men suffering from enteric fever."

Judging, then, from the instances there is little doubt that a disease very similar to kala-azar exists in many parts of India, and there is the possibility that it is endemic there, much as Malta fever is endemic in Malta.

Kala-azar as an epidemic appears to have been introduced into Assam as a continuation of an epidemic fever, of a lingering and exceedingly fatal form, which was prevalent in Rungpore during the later sixties and early seventies.

According to Rogers, who has been carefully investigating the history of the disease, it was first mentioned as existing in the Garo Hills about the year 1872, but it did not appear to have made much headway until 1875. The Garos called it "Sireari disease," or "Sahib's disease," giving as their reason the statement that the condition was unknown in their country until after the British occupation.

From the Garo Hills the disease has gradually spread up the valley of the Brahmaputra upon both sides of the river. It has travelled along the chief lines of communication, and has advanced from point to point without any coincident climatic change to account for an increase of malaria. The most extraordinary feature of the epidemic is the way in which it has attacked the indigenous population, who have been the first to be attacked, and who have probably suffered most severely. These people have been subject to malarial fever for many generations, and have doubtless acquired as marked an immunity to the disease as the natives in West Africa; it is therefore most improbable that they should be the first to feel the effects of an epidemic of malarial fever, and the ones to suffer most markedly. Such a supposition is entirely opposite to the experience of those who have studied malarial fever in other countries than India.

Next to the indigenous population, the oldest residents—time-expired coolies—have suffered most frequently, and from them the disease has been spread to old coolies upon tea gardens. Let me emphasise the fact that it is always the oldest residents that suffer first, although almost anyone exposed to the infection may contract the disease. I have visited a village of Kacharies (one of the indigenous tribes) of Assam which in two years lost 150 people from this disease. The empty houses were to be seen on all sides. On inquiry I learned that only three male adults had been left alive, and the population of the village consisted of these three men, some fourteen women, and a number of children of various ages. On questioning one of the men, he told me that the fever was quite different to the ordinary fever from which they sometimes suffered. That, unlike this fever, it was very severe, and besides lasting for many days, it always returned, until at last the patient died. The Kacharies state that the only way to avoid infection when once it has made its appearance is to keep on moving away from it, and at last double back and reoccupy the site that was first vacated. They liken it to a jungle fire, which must be dodged if danger is to be avoided.

The marked communicability of the disease is well illustrated by a striking incident which occurred among some people under my charge. In the early part of 1901 a coolie woman was attacked by kala-azar, and speedily became so ill as to require an attendant. Her husband, a sirdar, was allowed to remain from work in order to nurse her. After two or three months the woman died, and almost immediately afterwards her husband was attacked by the disease. Soon his condition necessitated a nurse, and a man of the same caste was put to attend him. After two months this attendant contracted the disease. Another man was allowed to act as nurse, but he also took the infection almost immediately. Then a third man was placed in charge of the case, and meanwhile the two former attendants both died. Then the sirdar died also, and within a fortnight the third and last attendant developed the disease, and after a very rapid illness he succumbed to the infection. These five cases occurred among old coolies who had kept good health for many years previously. The five successive cases covered a period of about twelve months.

What is the Nature of the Disease?

A careful examination of the facts at our disposal regarding both the clinical features and the epidemiology of kala-azar appears to me to negative the idea of malarial infection, whether chronic or acute. If we apply the three principles of diagnosis for malaria so clearly laid down by Manson: the clinical, that is, periodicity; the therapeutic, behaviour under quinine treatment; and, lastly, the microscopical examination of the blood—we shall be struck by the

significant fact that by neither of these methods can we arrive at a diagnosis of malaria when dealing with a case of kala-azar.

I propose to apply Manson's three methods in detail, and so I shall therefore first discuss the diagnosis from a clinical aspect.

Periodicity.

If we examine the chart of an early case of kala-azar, we shall probably note the remarkable irregularity of the febrile period. Sometimes the chart may resemble some of the irregular æstivo-autumnal malarial charts, but more frequently it possesses no sort of periodicity in its remissions. Sometimes, however, it shows periodicity, but when it does so it is only quotidian in character. Even then it does not resemble malarial quotidian periodicity so much as it does that seen in acute infective diseases. I have seen cases which exhibited a quotidian rise and fall almost identical with those shown in a chart from a case of infective endocarditis, given in Craig's recent book upon the "Æstivo-Autumnal Malarial Fevers."

In the second stage of kala-azar it is true the fever is usually periodical in character, but here, again, it is of a low type and of such long duration as to be altogether atypical of quotidian malarial fever.

what a remarkable analogy exists between the clinical pictures of Malta fever and kala-azar.

Detailed Comparison between Malta Fever and Kala-azar.

Age of Incidence.—Bruce gives the age of greatest incidence for Malta fever at from 6 years to 30 years. Rogers states that the age-incidence of kala-azar is 58·5 per cent. between 10 and 35 years, and 24·4 per cent. below 40 years. I can confirm Rogers' remark from my own experience. It is chiefly the younger individuals who are attacked by kala-azar. Very young children, however, seem often either to escape or to suffer less severely, although they are by no means exempt from attack.

Duration of the Disease.—Malta fever and kala-azar are the only two febrile diseases at present known in which the pyrexia may remain with but few intermissions for periods extending up to eighteen months. Bruce gives the duration of Malta fever at anything between a few weeks up to one and a half years. Kala-azar may last for two years, but its more common duration is about six months, though mild cases do not last nearly so long. Rogers gives the average from 193 cases at 7·4 months.

Character of the Fever.—According to both Hughes

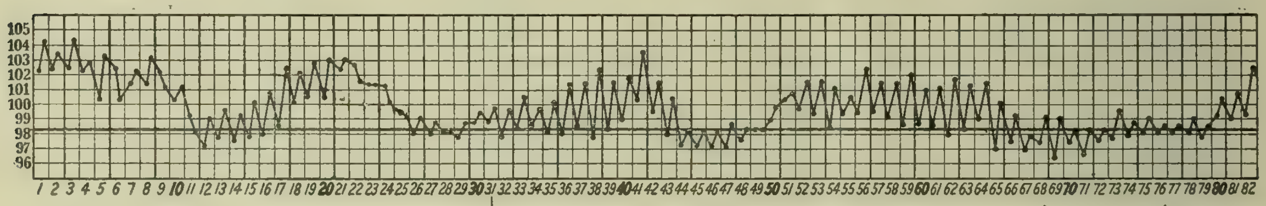


Chart of Case of Malta Fever.

Other Clinical Features of Diagnostic Value.

No doubt the occurrence of such a group of symptoms as fever, anæmia, pigmentation of the skin, enlargement of the spleen and liver, and apparent relapses after recovery, have caused kala-azar to bear a fictitious resemblance to paludism. But before expressing an opinion from these points alone we ought to ask the question, "Whether there is any other condition which exhibits these symptoms also?" A short study of any modern text-book dealing with the diseases of warm climates will satisfactorily answer the question in the affirmative.

In Manson's standard work a reference to p. 206, under the heading "Mediterranean Fever," we find the following definition :—

"Malta fever . . . a disease of indefinite duration . . . is characterised for its more typical form, or rather, made up of a series of febrile attacks, each attack, after lasting one or more weeks, gradually subsiding into a period of absolute or relative apyrexia of several days' or weeks' duration. Each spell of relative apyrexia is followed by a period of fever, which is again succeeded by relative apyrexia."

Further reference to the descriptions of this disease by Hughes, or by Bruce in Davidson's well-known book on the "Diseases of Warm Climates," shows

and Bruce, Malta fever tends to exhibit a chart showing a series of waves or undulations. This feature, however, is not constant, for a markedly irregular chart is not uncommon.

In kala-azar there may sometimes be seen an attempt at the formation of long undulations in the pyrexial curve. Often, however, the early temperatures show only marked irregularity. In the second stage there is usually a very regular temperature curve, the daily rise and fall maintaining a monotonous sequence week after week.

Comparison of General Symptoms.

Physiognomy.—According to Bruce's description of Malta fever, as it occurs among Europeans, the expression of the face becomes dull, listless, apathetic and anæmic. In long and severe cases the face may become of a dull clay colour. In kala-azar the patient soon shows a typical facies, best described as lethargic. He rapidly becomes anæmic-looking, although on examination his blood may be found with a fair percentage of hæmoglobin. His skin takes on a dull, unpolished, greyish earth-coloured appearance. It is a condition that I have so frequently remarked in conjunction with an enlarged spleen that I have often termed it the "splenic facies."

Alimentary System.—Vomiting and diarrhœa are sometimes reported as occurring in Malta fever, although constipation is one of its marked features. Similar symptoms are not infrequent in cases of kala-azar. Enlargement of the liver is reported as one of the pathological changes present in Malta fever (Bruce and Hughes). In some cases met with in India the enlargement is very marked. In kala-azar the increase in the size of this organ has by some been considered pathognomonic of the disease. In my experience, however, it may often be absent in milder infections. When markedly enlarged it is usually associated with ascites.

Respiratory System.—Epistaxis is common in both Malta fever and kala-azar. Pulmonary complications are not uncommon in Malta fever, a catarrhal condition being frequently seen in conjunction with high fever. In kala-azar pneumonia is a very common complication, and in many cases it appears to precede an attack of the disease. In the latter stages phthisis may supervene and eventually carry off the patient.

Circulatory System. — Palpitation is commonly developed during the courses of both Malta fever and kala-azar. A peculiarity referred to by Bruce as occurring in Malta fever, when the pulse-rate may remain practically normal in the presence of high fever, is one which I have frequently observed in kala-azar. In some cases it was so marked that without the use of a clinical thermometer one might readily gain the idea that a patient had no pyrexia. The peculiar pulsation of the carotids and a frequently-bounding pulse, present in advanced cases even during apyrexial intervals, has often caused the assumption of the presence of high fever in cases that on examination proved to have normal temperatures.

Blood and Blood Glands.—No detailed study appears to have yet been made of the hæmatology of Malta fever. Bruce gives the average number of red cells present at 3,500,000, and states that the leucocytes are usually normal in number. Cabot, Ewing, and Da Costa mention no changes of any importance. Apparently the condition has been neglected by most investigators. In kala-azar Rogers gives the average number of red cells at 2,460,000, and describes a marked decrease in the white elements. I cannot say that I have noticed this lessened number among the leucocytes.

The differential leucocyte count has frequently shown a very marked increase in eosinophiles. A probable explanation is the universal infection of coolies in Assam by the ankylostoma duodenale.

Bruce mentions the fact that pigment is rarely found in the peripheral circulation in cases of Malta fever. Ross found melanin present in 12 out of 26 cases of kala-azar examined by him in Nowgong. I cannot say that I have found it very often, although I have examined the blood of a large number of cases.

A moderate grade of secondary anæmia is generally reported as being commonly present in cases of Malta fever. This corresponds fairly well with what I have found in kala-azar. In cases of this disease, provided the patient is well fed, marked anæmia does not quickly show itself. It is only in cases who from some cause or other have not received a sufficient quantity of nourishing and digestible food that any great degree of anæmia may be found.

The hæmoglobin average of a large number of long-standing cases of the disease, examined by me, worked out at rather over 35 per cent. of Gowers' standard. This figure really represents about 50 per cent. of the normal in natives of Assam.

Enlargement of the spleen is referred to as a constant feature of Malta fever by various observers. It is also given as one of the pathognomonic symptoms of kala-azar. There are, however, many exceptions to both these statements.

Lieutenant E. O. Greig, I.M.S., has reported several cases of Malta fever occurring in the Swat Valley, where no enlargement of spleen or liver were found. On the other hand, increase in the size of these organs is not always present in cases of kala-azar. I have seen several cases in which there was no appreciable enlargement of the spleen, and many others which showed no hepatic enlargement.

Integumentary System.—Profuse perspirations are common to both Malta fever and kala-azar. The nightly-recurring "fever" which many natives, sufferers from the latter disease, complain about is really a recurring night sweat, occurring on the slight remission of the fever which takes place often in the early morning before sunrise. The native recognises the presence of fever by a sweat, and when that is absent he often cannot be convinced that he has fever. Bruce and Hughes both mention loss of hair as a common late symptom in Malta fever. I have frequently noted a loss of pigmentation in the hair of kala-azar patients, and a thinning of the hair may certainly be seen on occasion. One of the first signs of improvement in the condition is the darkened colour and thickened growth of the hair.

Nervous System. — Delirium and headache are common to both diseases in the early stages.

Pain and Swelling of the Joints.—This important symptom of Malta fever is frequently present in cases of kala-azar. Rogers mentions it as being so common as to lead to the admission of cases under the heading of rheumatism. I can confirm this as occurring in a large proportion of cases.

It will be seen from this somewhat lengthy comparison that there is very little to choose between the clinical pictures of these two diseases, and when we take into account the fact that the one description applies to Europeans and the other to natives of India, it will readily be seen what a striking analogy the two conditions present.

We have seen, therefore, that another disease than malaria may exhibit a train of symptoms and produce a condition almost identical with kala-azar, and the existence of such a disease being shown, the force of Ross's arguments against the idea of kala-azar being such a separate entity is entirely turned. How it occurred that the possibility of kala-azar being an epidemic form of Malta fever of a severe type has not presented itself to previous observers I cannot say, but the fact remains that this disease has been reported to have been present in certain parts of India since 1897, and before this, in 1894, Crombie spoke of the possibility of similar conditions being endemic

in this country, although at that time it was supposed that Malta fever proper was only an imported disease.

Evidence is accumulating from day to day to show that so-called Mediterranean fever is present all over the world in tropical and subtropical countries, and recently it has been shown to occur in Assam by Dr. J. A. Hislop and Major Semple, R.A.M.C.

I have also met with a number of cases of the disease, and as soon as I can arrange to apply the agglutination or sedimentation test in routine practice I have little doubt but that I shall be able to show that a large proportion of cases of fever met with in this part of Assam are of a similar nature.

As Ross has pointed out, the chief objections to the malarial theory of kala-azar are: (1) High death-rate and the intractability of the disease to quinine; (2) the absence of parasites and pigment and the existence of low fever in the later stages; and (3) its communicability.

As you will no doubt observe, the weight of these objections is increased fourfold with the discovery of another disease which presents such a marked similarity to kala-azar and to which only the first of these objections can be said to apply. In regard to point 3 I should like to direct your attention to the fact that in kala-azar, as all those who are familiar with the disease will agree, persons well advanced in the second stage of the disease are capable of conveying the infection to fresh localities, and forming new foci of infection. In fact, it is these people who have done most to spread the disease. Yet it is precisely, according to Ross, people who are in the second stage of the disease who should prove absolutely incapable of conveying the infection were it malarial, because as he has shown, they do not in that stage harbour any malarial parasites.

This appears to me to be a fatal objection to the malarial theory of origin, apart from any other evidence against the idea.

Another objection which I should like to urge against the theory of kala-azar being a post-malarial condition is the lack of any recent confirmatory evidence of the existence of such a fever as the *fièvre symptomatique* of Kelsch and Keiner, following upon a malarial infection. The only authorities who appear to mention such a condition are those quoted by Ross. Vandyke Carter's paper in which he mentions such a condition was published in 1887, the same year in which the *Micrococcus melitensis* was discovered. The work of Kelsch and Keiner appeared in 1889, and it is scarcely possible that these observers should have been able to take into much account in these researches the existence of this new factor in the etiology of continued fevers. It appears to me very probable that the fever described by them may, on further investigation, be found to be of non-malarial origin, but with a similar causation to kala-azar. Mannaberg distinctly states that he had never met with this fever, which, as he says, must be very rare.

The Therapeutic Method of Diagnosis.

Before passing on to the hæmatology of kala-azar I should like to call attention to the behaviour of the disease to treatment by the salts of quinine.

Practically all observers are agreed that quinine exerts but little influence in checking or controlling an attack of kala-azar. In some cases I have certainly seen an improvement in the condition of a patient while taking full doses of the drug, but I am inclined to think that this improvement was probably due to the fact that the patient was at the same time the subject of a coincident malarial infection. This idea is borne out by the experience that quinine appears to act most beneficially in those cases of the disease which occur among the most recent arrivals in Assam and who are probably the most susceptible to malarial infection. In the bulk of cases among old coolies, or among their children, born in the district, quinine exercises absolutely no beneficial influence. If given in very large doses it certainly has an effect in restraining the fever, but does not appear to exert any curative action. In the case of a woman now recovering from the disease, however, doses varying from 30 to 50 grs. per diem have been administered for ten months. Her fever, which continued almost the whole time, has now ceased, but any attempt at stopping the daily dose of quinine is quickly followed by a rise in temperature. Until quite recently, before I became absolutely convinced of the non-malarial nature of the condition, I have been in the habit of administering exceedingly large doses of quinine in the early stages of the disease, with a view to preventing the onset of the second stage of what I then supposed to be a malarial condition. To this end I have given quinine in repeated doses of from 30 to 60 grs. at one time, by the mouth, or 30 grs. intramuscularly by means of a Pravaz syringe. I used these doses after finding ordinary doses of no effect. In some few cases a temporary reduction of temperature took place. A peculiarity of many of these cases appeared to be their insusceptibility to the action of quinine. Cinchonism, except of a most temporary character, was never produced even after the heaviest doses. This drug can only be considered of use as a diagnostic agent, in cases of kala-azar, in a negative sense (as regards the malarial theory of its origin).

The Microscopic Examination of the Blood.

I cannot pretend to do justice to the hæmatology of kala-azar in this paper, but I hope to be able to indicate the true nature of the condition, as well as to show that the theory of malarial origin of the disease, is quite untenable.

Ross has shown in his report in how few instances of recognised kala-azar it was possible to find either malarial parasites or melanin—the evidence of their recent presence.

He himself recognises this as being one of the strongest objections to his theory. I do not need to add anything to what he has said beyond stating that to my knowledge several accepted authorities upon malaria have been unable to find any sign of malarial infection by the examination of films of blood from early cases of the disease. I have examined a very large number of cases personally, and only once have I found a living parasite in the peripheral circulation of a case, and in two other cases I have observed malignant malarial parasites (whether tertian or quotidian I cannot say) present in the splenic blood. I have likewise only once found a crescent body in

splenic blood taken from a case of kala-azar. In very few cases have I have been able to observe pigment in the peripheral blood, neither have I found pigmented leucocytes except on one or two occasions.

The differential leucocyte count of a small series of cases, which I examined, gave :—

Polymorphonuclear neutrophiles	.. 48	per cent.
Lymphocytes (small)	.. 24·0	,, ,,
Eosinophiles	.. 12·7	,, ,,
Large mononuclear	.. 14	,, ,,

I also observed a few normoblasts in several of the specimens. The large percentage of eosinophile cells noted is accounted for by the universal infection of all coolies in this part of Assam by ankylostòma in varying numbers. I have occasionally seen a very marked lymphocytosis in cases of kala-azar, even when no apparent cause existed to account for the increase.

The red cells do not appear to suffer much change in the absence of any other condition calculated to produce anæmia. Sometimes, as already mentioned, a few nucleated red cells may be seen. Poikilocytosis is uncommon, and polychromatophilia is rarely noted until a very late stage of the disease.

Blood-plates are usually very much increased, and appear to take on some change. In fresh films stained by Nakanishi's method, they often exhibit distinct spots of darker staining reaction. These are often so large as to be countable by means of an eighth-inch objective. These spots vary in number from one to five, and owing to the marked molecular movement of the bodies containing them, they led me at first to consider the possibility of their being organisms of some kind. In films dried and stained in the usual way they do not appear to exhibit any peculiarity, and their great number, together with the absence of intracorpuscular bodies at the same time, negatives the idea of their being the spores of malarial parasites. The great increase in the blood-plates is perhaps of some little diagnostic importance, because it appears in the pyrexial stage. Cabot, Ewing, and Da Costa state that blood-plates are decreased in malaria and most febrile affections, the exceptions being bubonic plague, measles, erysipelas, and scarlet fever.

To sum up briefly, the hæmatology of kala-azar lends no support to the malarial theory of origin, while it corresponds to the little at present known of the blood conditions in Malta fever. The application of the three methods of diagnosis recommended in cases of suspected malarial fever has shown that kala-azar fails to answer (1) the clinical test; (2) the therapeutic test; and, lastly, (3) the blood examination test. It therefore appears to me no longer possible to consider the question of malaria as a factor in the production of the disease.

I have put forward another theory which appears to me to agree with all the known facts about kala-azar, and to explain some of the peculiarities of the infection. We will now see what direct evidence can be shown to prove the correctness of my idea. Clinically, as I think every one will admit, the two diseases appear to resemble one another very strongly.

If we refer to any modern text-book dealing with Malta fever, we may see that most authorities agree in the statement that the diagnosis of Malta fever is to be made by the serum reaction of the case to cultures of the *Micrococcus melitensis*. Hughes states that the disease may be diagnosed from enteric fever, paludism, phthisis, liver or pelvic abscess, empyema, and other suppurating diseases, &c., by the reaction of the blood to cultures of the micrococcus of Malta fever, by the absence of the local and special symptoms of these diseases, and the absence of malarial parasites in the blood. He further states "that the serum reaction is often the only reliable sign," as the disease frequently simulates other conditions.

Let us see, then, how the blood of kala-azar patients reacts to the cultures of the *Micrococcus melitensis*.

About six weeks back, while examining the spleen pulp from a fatal case of kala-azar, I was surprised to find a number of micrococci present among the splenic cells and tissue. I was at once struck with the possibility of the condition being of micrococcal origin, and knowing that Malta fever was certainly present in the district, I certainly determined to have the matter cleared up.

Accordingly I sent two batches of blood specimens to Major R. Semple, R.A.M.C., Director of the Pasteur Institute, Kasauli, who has been most kind in examining them for me, for the reaction with cultures of the *Micrococcus melitensis*.

The results of these examinations are shown in the annexed table. Taken in conjunction with the finding of a micrococcus in the spleens of two cases of kala-azar, I consider the result of the serum test as absolutely conclusive.

Table of Reactions of Blood (9 Kala-azar and 3 others) to Cultures of Micrococcus Melitensis.

Cases	10 Dilutions	20 Dilutions	40 Dilutions	Remarks
1*	Complete	Complete	Complete	—
2*	Nil	Nil	Nil	—
3	Nil	Nil	Nil	Died
4	Complete	Complete	Complete	—
5	-	Partial	Nil	Died
6*	Complete	Complete	Complete	Died (dysentery)
7	Complete	Complete	Complete	—
8	Complete	Complete	Complete	—
9	Feeble	Feeble	Nil	Died
10	Complete	Complete	Partial	Died
11	Complete	Complete	Nil	Died
12	Complete	Complete	Complete	—

(Nos. 1 to 6 were also examined for reactions to cultures of typhoid, but gave no reaction.)

* Of these cases, Nos. 1, 2 and 6 had not been diagnosed as cases of kala-azar, although there was a marked resemblance to the disease. They had not occurred, however, in a garden infected by the disease, although within one mile cases were common enough. No. 1 recovered; No. 2 was very severely ill, and is still getting fever; No. 6 was not very ill, but died shortly after her blood was examined from severe dysenteric symptoms. All the remaining cases were known to be kala-azar. Of these No. 3 was a very severe case, his temperature ranging between 103° and 105° for nearly three months, with hardly a break. Of the other cases, Nos. 5, 9, 10 and 11 have all succumbed to the disease, the two latter ones within fourteen days of the examination of their blood. These figures support very strongly the conclusions arrived at by Birt and Lamb (*Lancet*, September 9th, 1899). The 9 cases of kala-azar were none of them picked specially. They were taken from among a number of cases of the disease in a line which has become infected during the past fourteen months, the population of which has been under my observation since January, 1901.

Evidently, whatever else it may be, kala-azar is essentially Malta fever. No doubt mixed infections, or rather coincident infections by malaria and dysentery, are common, but the primary condition is the one produced by the micrococcus to which I have referred. In this paper I cannot do more than point to this discovery. The bacteriological and experimental confirmation has not yet been attempted, and must be left to a future occasion.

All that remains for us to discuss at present are one or two points which will be raised by the putting forward of this new theory regarding kala-azar. It may be said that the death-rate in Malta fever is a low one, a fact which does not correspond with what we know of kala-azar. But we must remember that the death-rate for malaria is generally given as being no higher than 2 per cent., exactly the same figure that is given by Hughes and Bruce for Malta fever. Also all that Ross says regarding the question of death-rate when comparing the mortality of kala-azar with malaria applies with equal force to Malta fever.

A quotation from Hughes' description of Malta fever in Allchin's "Manual of Medicine," appears to me to explain very clearly the probable cause of the frightful mortality met with in kala-azar. Under the heading "Prognosis," Hughes remarks:—

"Favourable as regards life . . . , but most unfavourable as regards length of the attack, and consequent interference with livelihood."

The interference with livelihood is, as every one familiar with the conditions of life prevailing in India will admit, one of the most potent causes of increased mortality in any and all the diseases present in that country. Thus it is that we see a terminal form of dysentery complicating all debilitating diseases among the native population, and being directly responsible for nine-tenths of the deaths from these diseases.

Before concluding, it is necessary to ask the question, "How did this disease — kala-azar — arise?" Rogers, in his discussion of this problem, has pointed out the occurrence of epidemics of fever of a somewhat similar character to kala-azar, which took place some forty to fifty years ago in North-east Bengal, in the districts of Burdwan and Rungpore. Is it possible that Malta fever was then a new disease, introduced into India for the first time, perhaps, among the British troops who were poured into the country at the time of the Mutiny? Many of these men had seen service in Malta, Gibraltar, or other parts of the Mediterranean; and, as we know, the infection of Malta fever is a most lasting and chronic one, and might easily outlive a voyage round Africa. The introduction of the disease in this way would account for its extreme virulence. We are all aware that frequently diseases introduced for the first time among people totally unacquainted with them take on immediately the characters of an epidemic, and appear to increase in virulence. And in the case of Malta fever, the argument used by Rogers to explain the increased virulence of kala-azar has a force which its application to the malarial theory destroys. We know that many bacteria increase in virulence by being passed through susceptible individuals. We do not know that this is the case with the protozoal form of parasites.

We can easily imagine, then, how this disease, introduced, perhaps, some forty odd years ago, has gradually been extending over the country, first as a slowly-moving epidemic, and then becoming endemic, just as malaria, cholera, and dysentery.

This theory serves to explain certain points which have hitherto remained as marked exceptions to general ideas regarding malaria. For instance, the fact that the indigenous population of Assam should be the one to suffer most severely from the disease is quite at variance with our knowledge of malarial incidence. Had malaria not existed in Assam before the occurrence of kala-azar we might have understood it; but now we see that, though probably immune to malaria, the Assamese and Kacharies were fatally liable to contract this new disease, and little able to resist it. Passing, therefore, through numbers of susceptible persons, the disease has become aggravated and its effects more marked, as evidenced in the enormous enlargement of the liver and spleen, and the increased mortality.

The reading of the riddle of kala-azar has opened up a wide field for further investigation. At present we are ignorant of the mode of spread of Malta fever, whether through the air, by means of water or food, or by the bites of suctorial insects. We are also ignorant of any remedy for this disease, whose distribution appears to be as wide as that of malaria itself. There is probably no more promising field of research open to those interested in the problems of preventive medicine than the discovery of the means by which the infection of Malta fever is communicated, and the production of some serum or antitoxin, as a curative or prophylactic agent, against this disease.

In conclusion, I wish to mention my indebtedness to Major R. Semple, R.A.M.C., for having so kindly aided me by examining samples of blood—a part of the work for which my inability to obtain the necessary cultures of the *Micrococcus melitensis* has obliged me to seek some assistance in this investigation.

Translation.

TSE-TSE DISEASE IN TOGO (WEST AFRICA).

By Dr. Hans Ziemann, Naval Staff-Surgeon.

(*Translated from the German by P. Falcke.*)

(*Continued from p.* 371.)

Observation of the Togo Tse-tse Parasites in Stained Preparations.

In 1898 the author called attention to a method of staining which permits the structure of the parasite to be seen with a distinctness not hitherto attained.* At that time trypanosoma of *Rana esculenta* were stained by this method, and the verdict was pronounced that all other trypanosoma, such as the tse-tse parasite, are also stainable by this method, as given below: When the preparations of

* *Ziemann, Eine Methode der Doppet färbung bei Flagellaten, Pilzen, Scherillen u. Bacterien. Centralb. f. Backterien,* 1898, No. 25, vol. xxiv.

blood are spread out thinly, dried quickly by wafting backwards and forwards, and then hardened in absolute alcohol for ten minutes, the microscopical appearance in living and stained preparations can be readily compared.

The protoplasm of the parasites then appears of a tender blue, almost always vacuolised so that the vacuole-like places were not stained. The light spot noticeable in the anterior part of the body appears surrounded by a conglomeration of more or less crowded short, red-coloured chromosoma. In rare cases I saw them in the form of a fairly compact, roundish or chromatin lump somewhat frayed out at the periphery. Rarely the lump of chromatin was seen to be surrounded by a more or less distinctly marked achromatic zone such as has been sometimes described in the adolescent forms of malaria parasites. In the broad forms which have but little motility, a minute fissure, a sign of commencing longitudinal division, could be seen running through the heap of chromosomes.

In apparently youthful forms this lump of chromatin is often likewise surrounded by an achromatic zone. When two or three compact lumps of chromatin were present these might lie side by side or one behind the other, occasionally connected with each other by a delicate area of chromatin substance.

In the preparations I made one sometimes perceives between the anterior larger lump of chromatin and the smaller one behind a red-stained, slender thread representing a sort of connection between them. As this thread, when present, runs obliquely, it creates the optical impression of a somewhat flattened parasite which is turned around the longitudinal axis. This thread may be regarded as the edge of the ciliated margin.

In some instances a sort of *dust-like solution of the chromatin was observable*, so that instead of an anterior and posterior heap of chromatin a number of the most delicate grains of chromatin could be seen divided over the entire body of the parasite. In these cases the blue stain of the protoplasm was very faint, or even imperceptible. *As, however, in other trypanosoma, the body of the protoplasm was readily stainable with blue, I conjecture that it is doubtless the case that male specimens exhibit weak blue staining and female specimens are distinguishable by a dark blue staining, so that eventually, in the tse-tse parasites, males and females will be differentiated. An interesting parallel will thereby be furnished to the microgametes and microgametocytes of the halteridium, proteosoma and malaria parasites.*

Propagation.

It is interesting to note that streak preparations of the internal organs of the dead dog exhibited no forms of propagation. In contradiction to Schilling's reports as regards horses, only a few isolated ordinary trypanosoma were discovered in the streak preparations of the bone marrow of the terrier, no forms of propagation were to be seen.

One may therefore be justified in asserting that in this remarkably acute case of tse-tse disease the germs of disease invaded the body in enormous numbers, but in a form other than the ordinary tse-tse parasite. There they had become speedily transformed into the well-known form, their deleterious influence at once commenced, and at the moment of the death of the host (the terrier) the asexual multiplication by means of longitudinal division was in progress.

Plimmer and Bradford state that they have, in tse-tse parasites, observed the processes of longitudinal and transverse division, conjugation, and the formation of plasmodium.

The author only observed one manner of segmentation, the longitudinal, in the streak preparation from the heart blood of the terrier, and this even rarely, owing to the dog having died a little too early. The division doubtless began from the flagellated end and all the constituents of the parasite were involved. Parasites were observed attached posteriorly in the region of the posterior grain of chromatin, *but more frequently the longitudinal division appeared to take place simultaneously throughout the entire length of the parasite.*

Copulation.

In preparations of the living blood some parasites were to be seen drawn out at length at either extremity. They possessed marginal cilia at each longitudinal margin, and two flagella, one posterior and anterior; when stained they were seen to attain a length of 24 to 26 μ, and instead of exhibiting the usual arranging of chromatin they possessed two little loose heaps, one at the root of each flagellum. It is impossible from the small number of preparations to assert that *these were copulating forms, as the posterior portion of one parasite lay close to the anterior portion of the other.* In that case, however, the anterior chromatin heap of the one parasite would co-mingle with the posterior chromatin heap of the other and *vice versâ*. Further investigations are necessary on this important point.

Method of Staining.

Solution A.—This method, as published in *Centralb. für Bakt. u. Bar.*, 1898, No. 25, is briefly communicated by desire.

One gramme methylene blue (Höchst) absolutely pure to be placed in a china mortar and macerated, and gradually dissolved in 100 grammes warm distilled water and placed in Erlenmeyer's flasks, and shaken until the methylene blue is entirely dissolved. To this hot 1 per cent. methylene blue solution add gradually 2·5 gr. pure powdered borax. While continuously shaking the hot solution hold it periodically over the flame, but do not allow to boil. Allow the solution to stand a day or two and shake now and then.

Solution B.—One gramme eosin (Höchst Ag or BA) dissolved in 1,000 gr. hot water; or better still the solution to be always freshly prepared from 1 per cent. eosin solution mixed with 10 parts aq. destillat.

Solutions A and B being thus prepared, the specimens should be spread out very thin, dried in the air and hardened in absolute alcohol for ten minutes, then dried between blotting paper. The preparations

are then to be placed face downwards one at a time in a small plate-glass vessel. Then three parts of solution A to be filtered into a measure glass, twelve parts of solution B to be added and stirred with a glass rod. Enough mixture then to be quickly poured over the preparation to quite cover it. A metallic membrane forms on the surface of the mixed colour, and this must not come into contact with the preparation. After five minutes, or at latest ten minutes, the metallic membrane to be removed with a piece of blotting paper. The cover-glass preparation to be quickly removed with forceps and rinsed in water, then placed in a solution of acid-acet. 0·1 in 1,000 for a second or two, then in 60 to 80 per cent. alcohol for two or three seconds, then rinsed in water for five to ten seconds, and lastly examined in water. Later permanent preparations should be afterwards carefully dried in Canada balsam. The nuclei of the leucocytes being of a deep red or carmine tint is a test that the preparations are good. When there is sediment or the preparation has "run" it should be treated first in a very thin solution of acetic acid, than in diluted alcohol, and subsequently in water.—*Berliner klin. Wochenschr.*, 1902, No. 40.

LISTERISM IN TROPICAL COUNTRIES.

From the Lister Jubilee Number of the "British Medical Journal," December 13, 1902.

The benefits accruing to surgery by the introduction of Listerism are not limited to the people of our own country nor to those of Europe. In distant and uncivilised regions, in the outlying islands of tropical seas — in fact, wherever medical men trained in modern surgical methods have penetrated, the effects of Lister's teaching are apparent. The uneducated natives of Asia, of Africa, or of Malaya appeal to the white man, be he merchant or missionary, to treat their ailments. A white man, by these untutored peoples, is regarded as a fountain of knowledge on things medical especially.

Medical men trained in the practice of antiseptic surgery, occupying advanced posts in the spread of civilisation, can now urge with more confidence the benefits and the curative results of surgical operations. Cures can, in many instances, be almost guaranteed since Lister taught; and an appeal can be made to the shy native to submit to operation with a well-grounded belief and hope that all will go well. In the "old" days to remove a urinary calculus, or amputate a limb, in the hut of a native, or in the rudely-constructed hospital saturated with the poisons of repeated erysipelatous outbreaks, meant a risk that few cared to take. To any one commencing practice amongst natives the difficulty is to gain their confidence; at first their ignorance is against the surgeon, but once their confidence is gained their ignorance is with him. Successful surgery appeals to natives in a manner nothing else can do, and success in surgery to, say, the medical missionary means much. It enables him speedily to gain a footing and an intimacy with the community amongst whom he dwells.

In this sense Lord Lister has contributed to the spread of civilisation in a marked degree. The confidence of the medical practitioner in his power to cure tells markedly when he has to answer the doubts and allay the fears of the astute Chinaman, the apathetic Malay, the prejudiced Hindu, or the fetish worshippers of Africa, when they come for a surgical opinion. The native of all climes is quick to note the difference between the "hedgings" of uncertainty and the tone of confidence it is now possible for the medical practitioner to assume, owing to the advances of modern surgery; and the relief to suffering mankind is in proportion.

Not only on general principles can this be urged, but concrete examples of the revolution Lister has brought about in surgical work in the tropics can be adduced. One will suffice.[1] In Calcutta hospitals, between the years 1856 and 1870 the mortality after major operations, according to Sir Joseph Fayrer, amounted to 45·13 per cent., whereas, when strict antisepsis was practised, Colonel Kenneth MacLeod reports that from 1886 to 1890 the death-rate after major operations in the same city fell to 7·10 per cent. In every corner of the world, in peace and war, in the crowded Eastern cities with their well-appointed hospitals, or in the primitive building, styled a "hospital," of the medical missionary, the same tale is told, and the white man's burden has been made easier in consequence.

In the more specifically tropical ailments requiring surgical treatment asepticism is conspicuously successful. Hepatic abscesses can now be searched for with a sterile needle without danger, and the abscess itself can be evacuated with a hope of success impossible in pre-Listerian times. The elephantoid tumours associated with filarial disease can, when dealt with antiseptically, be removed with well-nigh no anxiety. The tumours of the scrotum, weighing it may be 100 lb. or more, which when removed leave extensive wounds, present no reason for hesitation on the part of the surgeon.

These facts speak for themselves, and it requires no elaborate inquiry to gauge the inestimable benefits Lister has bestowed on all races of mankind. These benefits will be permanent, for they rest on a scientific principle. The method of its application to practical surgery may be varied, but the principle will remain as the sure guide of surgeons for all future time, and as an imperishable memorial of the genius and the lofty courage of the great man to whom this special number is dedicated.

Reviews.

Die Malaria. By Battista Grassi. Pp. 250, with 5 plates and 15 illustrations in the text. 1901. Gustav Fischer, Jena.

Chapter II. *Distances attainable by the Anopheles.* —In reply to the question: To what height can an anopheles fly? the author cannot give a comprehensive reply, though he has made a study of the subject.

[1] Cantlie, "International Text-book of Surgery": Gould and Warren, vol. ii., Surgery and Surgical Operations in the Tropics.

He, however, observed that at sunset in the village of Paestum, the *Anopheles claviger* flew up to the third story of a house (about $12\frac{1}{2}$ metres), and it was even proved that they flew over the roof of this house, a distance of about 15 metres from the ground floor.

As a rule, however, it may be noted that:—

(1) The rooms on the second and third stories of houses are rarely visited by anopheles, but they are present in thousands on the ground floor.

(2) The author found numerous anopheles near the small lake of Montorfano (by Como), but they were absent from the village of the same name only a short distance off and a few metres higher.

(1) The anopheles can, however, cover considerable ground by successive flights in a horizontal as well as in a perpendicular direction.

(1) They may be transported passively for long distances, as by caravan, cart, &c.

(3) They may be wafted great distances by the wind.

The facts comprehensively taken amount to this: That the wind is capable of carrying the anopheles from their birthplace; not, however, as a rule, for long distances, though this may exceptionally take place.

CHAPTER IV. *Experiments and Observations that prove that the Anopheles come into Existence without a Trace of Malarial Germs.*—Experiments for this purpose were undertaken by Bignami and Bastianelli in 1899, in Spital Santo Spirito, Rome, as also by the author in his own laboratory. Grassi's experiments were as follows: Having by repeated microscopical examinations convinced himself that the newly-fledged mosquitoes (*A. claviger* and *A. bifurcatus*) were not infected, he allowed them to bite himself and seven persons, not one of whom, however, suffered from any consequences. The anopheles were bred and kept by the author in a room arranged to conform as much as possible to the natural surroundings of the anopheles.

CHAPTER IV. *Experiments Conducted with a View to Proving that the Malaria of Man is not Associated with the Malaria of Animals.*—In 1889 Dionisi injected blood from an owl containing an enormous number of *H. subprœcox*, into a man, with negative results.

A malarial parasite of sparrows, *H. relicta*, only developed in 30 anopheles, but it simultaneously infected nearly all the *Culex pipiens* who bit the same sparrows. This experiment may therefore be regarded as conclusive.

The author repeatedly caused young sparrows to be bitten by anopheles infected with Laveran's sporozoites, but the results were negative.

The author also proved that infected *Culex pipiens* could bite human beings without untoward results.

Notes and News.

THE "PRACTITIONER" UNDER NEW AUSPICES.—We have pleasure in notifying the advent of a new volume of the *Practitioner*, a medical review, which will commence with the January number. A new series will commence with this volume. Published monthly, price 2s. Annual subscription: United Kingdom, 21s.; Colonies and abroad, 22s, post free. Subscriptions should be sent either through your bookseller or direct to the *Practitioner*, Limited, 30, Holborn, London, E.C. We wish the *Practitioner* continued success under its new auspices. We learned much that was new in medical journalism when the periodical was under the gifted editorship of Mr. Malcolm Morris, and tropical practitioners were particularly indebted for the special numbers of the *Practitioner* which dealt with malaria and plague.

SHARK-BITE.—Dr. J. A. Guthrie, Surgeon U.S.A. Navy, writing from the Philippines, describes three cases of shark-bite from which recovery took place. One case was that of a naval apprentice who, whilst swimming, felt himself being dragged under the surface of the water by some powerful force. Suddenly, after experiencing pain in the left knee, he felt himself liberated and swam to a boat close by. It was found he had lost his leg, but by an improvised tourniquet made from a piece of a shirt and a stick the femoral artery was arrested. The limb was subsequently amputated and the lad recovered. One interesting feature of the case was the absence of pain when seized by the shark. A second case related by Dr. Guthrie was that of a Moro who was bitten severely in the thigh by a shark. A large piece of the front of the thigh, measuring 10 by 6 inches and extending down to the bone, was removed, but the patient did well. The third case, a Moro, was bitten in the face whilst swimming and catching fish with his hands. Although the nose was hanging by a mere shred of tissue, Dr. Guthrie sutured the wound within an hour after the accident, and the parts united by first intention.—*New York Med. Journ.*, November 22nd, 1902.

COLONIAL CONGRESS IN PARIS.—A Colonial Congress in Paris will take place on March 8th, 1903. All medical men who are acquainted with colonial practice and who are likely to introduce subjects interesting or profitable to residents abroad are invited. The discussions are arranged under five headings: (1) Climate; (2) dwelling; (3) food; (4) clothing; (5) the *régime* of life. We wish the Colonial Congress in Paris every success, and feel sure that many measures conducive to healthy life in warm countries will be suggested.

Current Literature.

PLAGUE.

Prevalence of the Disease.

India.—During the weeks ending November 15th, 22nd and 29th, the deaths from plague in India numbered 10,441, 12,028 and 12,103 respectively. In the Bombay districts the death-rate from plague continues high, amounting, during the week ending November 22nd and 29th to 6,937 and 5,935 respectively. The worst places in the Bombay Presidency during the period in question were Belgaum district, Dhurwar, Kolhapur State, Satara and Khandleish. Plague has increased in virulence in Bengal, the districts and towns most seriously affected being Saran, Monghyr, Patna, Dhurbhanga, and Shahabad. Inoculation for plague with the new modified serum has been carried on in the Mysore Province for some months, its protective value becoming popularly established. A notable instance occurred recently at Yedahalli in which five uninoculated persons of a family of seven died of plague, the other two being perfectly protected. It is officially stated that the present wholesale disinfection operations in Bangalore should not cost more than Rs. 80,000.

Egypt.—No case of plague has been reported in Egypt since November 19th.

Cape of Good Hope.—A case of plague was reported at Port Elizabeth on November 17th. The last preceding case occurred on September 23rd.

Mauritius.—During the weeks ending December 11th, and 18th, the fresh cases of plague in Mauritius were returned as 23 and 27 respectively, and the deaths from the disease 16 and 14.

CHOLERA.

Egypt.—During the weeks ending December 2nd, 9th, and 16th, the fresh cases of cholera reported in Egypt numbered 20, 42, and 60, respectively. Alexandria continues to be the most seriously affected city. Cairo has been free of cholera since November 4th. Besides Alexandria, the only places in which cholera exists in Egypt are at Behera, Damietta and the Gharbieh province.

Philippines.—Serious outbreaks of cholera are announced to exist in several parts of the Philippine Islands.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medecine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—JANUARY 15TH, 1903.

Original Communications.

SURGICAL TUBERCULOSIS IN EGYPT.[1]

By FRANK COLE MADDEN, M.B., B.S.Melb., F.R.C.S.Eng.

Professor of Surgery, Egyptian Government School of Medicine; Senior Surgeon, Kasr-el-Ainy Hospital, Cairo; Vice-President of Section of Surgery.

MR. PRESIDENT AND GENTLEMEN,—In submitting this paper to the Congress, I wish to direct your attention to the extraordinary prevalence of surgical tuberculosis in Egypt, and at the same time to point out some of the main local characteristics of this disease.

I have not yet prepared any elaborate statistics, but there is no doubt that, after surgery connected with the genito-urinary tract, there is no other class of conditions so common in hospital practice in Egypt. As a basis of comparison I may contrast my experience at the Hospital for Sick Children, Great Ormond Street, London, with that at Kasr-el-Ainy.

On examining the books of the latter institution one is struck by the fact that there are a great many more cases of surgical tuberculosis admitted than medical; and, although the difference in European hospitals is probably always in favour of the surgical cases, the extraordinary disparity between the two is, I believe, not so marked as in Egypt, where we could, at almost any time of the year, fill our surgical beds over and over again with patients suffering from surgical tuberculosis waiting for admission from the out-patient department.

A peculiar feature also of surgical tuberculosis in Egypt is the rarity of its association with medical tuberculosis, such as phthisis, meningitis and tubercular ulcerations of the intestine. Further, there is rather a tendency towards a localisation in one particular organ or group of tissues, and for this reason I do not think it is so common to find a case "riddled with tubercle" in Egypt as in London.

Surgical tuberculosis here, as elsewhere, is no respecter of age or sex; but though, naturally, the majority of the cases occur in young people, the average age is distinctly higher in Egypt than in London. This is particularly noticeable with such conditions as epiphysitis. Again, except for the irritation due to vermin and parasitic skin affections of all sorts and kinds, distributed over the whole of the skin surface, but especially on the head, so common in Egypt, there is a peculiar absence of such predisposing causes as carious teeth, acute throat affections with enlarged glands, hypertrophied tonsils, adenoids and ear disease, all of which are so prevalent in London.

Herbert Milton, in describing his experience of 1,000 cases of tubercular cervical glands in "St. Thomas's Hospital Reports" for 1888, calls attention to the almost constant presence of vermin or favus on the heads of young children, particularly in girls, and their association with tubercular glands. With the shaven heads of growing boys and men the number of cases of glands is far fewer. In effect he says: "No pedicular or other parasitic irritation, no glands." This is not absolutely true, however, for we find a good many cases even with shaven heads, so there must be some other fruitful source of infection. Watson Cheyne is "inclined to think that infection takes place in many instances from the blood-stream, the bacillus finding a lodgment in glands which have been the subject of a previous simple inflammatory enlargement. This may explain many of our cases occurring in the absence of any definite local cause."

In a large proportion of cases, other than glands, there is strong evidence in favour of neglected injury as predisposing to tubercle. This is particularly noticeable in cases of tubercular knee, examples of which will be referred to later.

While tuberculosis is common *generally* throughout Egypt and the Soudan, it is very striking how often the Soudanese are the subjects of surgical tuberculosis,

[1] Paper read before the First Egyptian Medical Congress.

especially of tubercular bone disease, and how extraordinarily difficult they are to treat. Once tubercle has lodged in a Soudanese bone, it is only too often quite impossible to remove the disease by any operation short of amputation at a joint or through a long bone, or by complete removal of an affected short bone. The power of resistance to the invasion of tubercle appears to diminish as the colour of the skin becomes darker, until in the young unhealthy Soudanese it is almost a neglible quantity.

After this general introduction we must now consider the subject under various headings and discuss the main feature peculiar to each.

To obtain some idea of the comparative frequency of surgical tuberculosis in various parts of the body, I have taken notes of a series of 78 consecutive cases under treatment in my wards during the last six months in Kasr-el-Ainy Hospital, and the results entirely confirm the general conclusions I have come to during my residence in Egypt.

There were 2 cases of cold subcutaneous abscesses; 31 cases of tubercular lymphatic glands; 30 cases of tubercle of bone; 10 cases of tubercle of joints; 3 cases of tubercle of testis; 2 cases of tubercle of peritoneum. This does not nearly represent the full total of cases of tuberculosis in my wards during this time, as I have only included those which came under my own personal treatment, and have omitted all treated by my assistant, Dr. Francis Badir, and the resident surgical officer.

(1) Tuberculosis of the Skin and Subcutaneous Tissues.

Lupus vulgaris is very common in Egypt, but much less common than is generally supposed; for I am sure that a great many cases of so-called lupus are really manifestations of tertiary syphilis, either of the acquired or, more often, of the congenital type. Many of these cases exhibit extensive destruction of the nasal and superior maxillary bones, a condition which is never seen in the worst cases of lupus vulgaris.

It is not only on the face, however, that one meets with lupus vulgaris, for I have seen it on almost every part of the skin surface.

There is an excellent opportunity in Egypt of treating lupus by direct sunlight, according to the Finsen method; but, unfortunately, the process is tedious and the improvement so gradual that it will be very difficult to persuade our Egyptian patients—at any rate in hospital practice—to submit themselves to this form of treatment.

Apart from lupus vulgaris, one is struck by the almost entire absence of tubercular ulceration of the skin, *per se*, of subcutaneous nodules in young children and of senile skin tuberculosis in later life. Similarly, subcutaneous cold abscesses are comparatively infrequent.

(2) Tuberculosis of the Lymphatic Glands.

The cervical glands are most commonly affected, in fact, in the 78 cases of tuberculosis of all forms, 30 were tubercular cervical glands. This does not, however, give a fair idea of the relative frequency of these cases, for we are unable to admit more than a small proportion of the many cases awaiting admission.

Watson Cheyne, in the "Harveian Lectures" for 1899, says that the most frequent seat of tubercular cervical glands is the anterior triangle and after that the sub-maxillary region. This distribution is probably explained by the frequency of carious teeth as a predisposing cause of glands in England; for in Egypt, with pediculosis and kindred conditions of the head so frequent, we find that the most usual group of glands affected is that lying along the posterior border of the sterno-mastoid muscle in the posterior triangle of the neck. From this point the infection seems to extend forwards under the muscle to the sub-maxillary region and along the deep vessels of the neck. One constantly finds a chain of much enlarged caseous glands just under the skin, and, deeply, a multitude of very small softening glands, intimately adherent to the carotid sheath, especially along the internal jugular vein. These extend all the way down the neck, even behind the clavicle, and are not infrequently traceable outwards across the base of the posterior triangle into the axilla, by extension along the lymphatics accompanying the subclavian and axillary vessels.

Seeing the extraordinary frequency of tubercular *cervical* glands, however, it is rather remarkable that so small a proportion of axillary glands are affected. Herbert Milton, in his statistics of 1,000 cases of glands, found the axillary glands affected in only 10 per cent. Further, there were only 5 per cent. of femoral and inguinal glands; and I have always found these secondary to either some local tubercle of the skin or subcutaneous tissue in the neighbourhood, to iliac or ilio-psoas abscess, or to tubercular disease of bone.

In all situations the frequency of caseation of the glands is extraordinary; for where in England one would expect to find enlarged soft glands due to the transformation of their structure into tubercular granulation tissue, in Egypt the granulation tissue seems to increase so rapidly that caseation occurs very early, and it is quite common to find every excised gland the subject of some degree of caseous change. This condition of the glands naturally makes the operation for their removal more tedious, as it is so easy to burst them and so increase the risk of re-infection and recurrence.

Occasionally one meets with cases in which there is an enormous enlargement of one or two individual glands, more especially in the submaxillary region and along the anterior border of the sterno-mastoid muscle. These patients generally do well after operation, as it is not usual to find the mass of small, deep-seated glands associated with this class of case.

In many cases, unfortunately, there is an infection of almost every gland and group of glands in the neck; and small lymphatic glands overlying the submaxillary and parotid glands are constantly demonstrated. At a later date all these masses of glands approach the surface and the tubercular process extends to the skin, until there is a complete collar of glands covered with skin which is riddled with unhealthy tubercular sinuses and ulcerations leading to a deposit of caseating material, consisting of glands, fascia, fibrous tissue and muscle, all infiltrated with tubercle and matted together in one thick, structureless mass.

Medical treatment is usually quite useless, except in the form of cod-liver oil and iron to improve the patient's general condition before operation. Further, all the early prophylactic and hygienic measures of such service in Europe cannot find much application in Egypt, as one never has the opportunity of seeing a case at a treatable stage, though as far as possible all local sources of irritation must be removed by appropriate treatment.

Complete removal of the glands must be practised as far as possible in all cases, and the more thorough the operation the more hope of ultimate cure. As a general rule it is advisable to make very free skin incisions, in some cases even to raise large apron-shaped flaps, so as to expose the field of operation as thoroughly as possible.

One has no hesitation in removing any length of jugular vein between ligatures if necessary, but great care must be taken not to injure the vagus nerve. It is very rarely necessary to divide the sterno-mastoid muscle, and whenever possible the spinal accessory nerve should be dissected out of the mass uninjured. In difficult dissections I have found the metal "dissector" (the use of which has been much recommended by Watson Cheyne) very useful, especially in the neighbourhood of the large vessels. Unfortunately, however, it is often quite impossible to perform a clean excision of the glands, owing to the presence of sinuses and much matting together of all the underlying structures. In this case scraping and the application of pure carbolic acid, with subsequent plugging with sterilised gauze, is the only possible treatment.

In the series above quoted there were two cases of special interest. The first was one in which almost every gland in the body was enlarged, and was associated with phthisis and repeated fits, described as epileptic. No operation was possible, and later the *post mortem*, besides advanced phthisis, revealed general lymphatic gland infection and several large tubercular masses in the brain, both on the surface, over the motor area, and in its substance.

The second case presented all the characteristic symptoms of Hodgkin's disease, and had been treated in the medical wards for over a year without appreciable benefit. A softening cervical gland seemed to call for surgical interference, and at the operation which followed a large number of caseous glands were removed. A few days later the child died suddenly after a convulsive seizure. On *post-mortem* examination there was found to be extensive tubercular infection of all the lymphatic glands, originating apparently in the bronchial glands; the spleen was much enlarged, but contained no tubercles, and there were many tubercular ulcerations of the intestines. The case was one of generalised tuberculosis of lymphatic glands simulating Hodgkin's disease; indeed, some pathologists go so far as to say that the two conditions are one and the same.

(3) Tuberculosis of Bone.

Of the 78 cases I have collected recently, there were 30 cases of tuberculosis of bone; but this does not nearly represent the true proportion of such cases, as it is quite impossible to admit more than a limited percentage of chronic bone cases.

Of the number there were 4 cases of tuberculosis of the sternum, which is much more frequently affected in Egypt than in England, where the most usual cause of necrotic caries in this situation is a syphilitic gumma.

The tubercular process frequently appears to originate on the posterior surface, and comes forward by the edge of the sternum in the intercostal spaces. Eventually a collection of softened tubercular granulation tissue appears to one side or other of the manubrium, or at the upper part of the gladiolus; and, if left to itself, may burst and leave a chronic sinus leading down to the bare edge of the sternum. Very often, however, the whole of the upper portion of the bone is involved in a rapidly spreading necrotic caries; and after removing the diseased parts by operation it is common for the pericardium to be exposed. In one case, in which the manubrium was alone affected, the upper portion of the ascending aorta and the beginning of the aortic arch could be seen pulsating in the depths of the wound.

As these cases generally occur in Soudanese they are particularly difficult to treat, and in all cases the progress of treatment is very slow. As free a removal as possible of the diseased bone is practised, the operation being usually followed by a long course of plugging with sterilised gauze.

Tubercular dactylitis is also very common, and is usually associated with tubercle which has already extended to the bones of the carpus or tarsus, and leads eventually to implication of the neighbouring joints.

A very frequent form of necrosis, though not always tubercular in origin, is that affecting the posterior surface of the lower end of the femur. The patient usually seeks admission to hospital because of a swollen knee, which is strongly flexed and fixed in that position; and a large abscess surrounding the lower end of the femur, or a series of sinuses leading down to the necrosed bone. Although the effusion into the knee is at first only due to irritation from without, the involvement of the joint in the tubercular process is only a matter of time. Even before this occurs we too often find that dislocation of the tibia backwards has occurred from the constant flexion. Many of these cases come to amputation in the middle of the thigh, and, in general, it is very disheartening how many cases of tubercular disease of bone and joints require amputation owing to delay and neglect on the part of the patient or his parents. Tubercular epiphysitis is quite uncommon. The symptoms and treatment of tuberculosis of the bones of the limbs present no special features; but, unfortunately, the treatment of too many cases is almost hopeless, and eventually amputation has to be practised.

We must also refer to tuberculosis of the spinal column, excluding the sacrum, and to tubercle affecting the pelvic bones, including the sacrum. It is necessary to make this distinction, as spinal caries is not at all frequent; whereas one meets with many cases of tubercle of the bones of the pelvic girdle. Cases of spinal caries *do* occur (there were 6 cases in the 78 before mentioned), but psoas, ilio-psoas and

lumbar abscesses from this cause are uncommon; while iliac, lumbar and gluteal abscesses from involvement of the pelvic bones are very frequent.

Again, one rarely finds spinal caries that cannot be treated in the out-patient department with very slight support, as the cases are usually self-cured already, though with marked deformity. I only remember to have seen two cases of paresis from this condition.

On the other hand, tubercle of the pelvic girdle is quite common, and exceedingly troublesome cases they are to treat. The usual signs are the presence of long, irregular sinuses all over the buttocks and lower part of the loins and in the groins, with or without an iliac or a lumbar abscess. Owing to the difficulty of clearing out the sinuses and removing the cause of the trouble treatment is very unsatisfactory.

One case of sacral necrosis was complicated by the presence of a fæcal fistula, quite a large opening into the rectum being visible in the depths of the wound. By plugging the wound firmly with sterilised gauze and keeping it very clean the fistula soon closed, and an operation for the removal of a large piece of the sacrum was subsequently performed.

The *post mortem* on another old case of spinal caries, admitted in a dying condition, revealed extensive general lardaceous disease. It is very extraordinary that, in spite of the large number of cases of chronic suppuration from tubercular bone disease and other causes in Egypt, lardaceous disease is exceedingly rare.

(4) Tuberculosis of Joints.

Ten of the 78 cases collected were tuberculoses of joints, and there are a few striking features in connection with these cases. One is at once struck by the great rarity of hip disease in Egypt, and the fact that there is not one Thomas's hip splint in the hospital is striking proof of its rare occurrence.

Tubercular knee is fairly common (4 of the 10 joint cases in the 78) and, unfortunately, is usually met with at a stage when an extensive excision offers the only chance of saving the limb. Too often, however, the bones above and below the joint are found to be so widely infiltrated with tubercle that amputation, either primarily or after the failure of an excision, is inevitable.

I have noticed three cases in which the onset of a tubercular knee was exactly like that of a septic arthritis. In each instance the joint was opened and apparently laudable pus evacuated, but the swelling persisted (though the temperature fell) and the wounds refused to close. In all three cases there was a definite history of injury followed by effusion into the joint, with subsequent rigors, pain, high temperature, and all the usual signs of septic infection. All were relieved for a time by free drainage of the joint, but there soon followed a gradual transition to the characteristic features of a tubercular knee, with large, gaping wounds filled with masses of tubercular granulations. In all three cases excision had ultimately to be performed.

Tubercular ankle is common also. In many of the cases I have seen the disease began originally as a tubercular teno-synovitis behind the malleoli or in front of the joint. I have at present under treatment a case in which both ankle joints are affected, one starting as a teno-synovitis, the other as a caries of the head of the astragalus and anterior portion of the os calcis. This bony origin is common, and by the time that the ankle is affected the caries has usually already extended to all the bones of the tarsus. So rapid is the progress of tubercle in the small bones of the foot that it is very rarely possible to find a suitable case for excision, either of an individual bone or of the ankle-joint. Indeed, practically the only treatmext for tubercular ankle in Egypt is amputation in the lower third of the leg.

Tubercular shoulder is quite rare and presents no special features of interest. Tubercular elbow is common and more often begins as a necrotic caries of the olecranon or of the head of the radius than in the radio-humeral joint or in any other part of the synovial membrane. As regards treatment, excision has in my hands been most unsatisfactory, so much so that once the condition has become well defined amputation in the middle of the arm seems to be the only course to pursue.

Tubercular wrist has usually progressed to such an extent before we see it that amputation in the lower third of the forearm is inevitable. The disease usually begins in the carpal bones or as an extension from dactylitis, and occasionally as a teno-synovitis.

Generally speaking, one may say that tubercular wrists, elbows and ankles almost always require amputation and tubercular knees generally.

These are only some of the instances of the difficulty of treating tuberculosis in Egypt: there are so many cases in which it seems almost impossible to eradicate the disease, even locally, once it has taken a hold of the patient. The resisting power of the individual against tubercle seems very often to be practically *nil*.

(5) Tuberculosis of the Testis and Genito-Urinary Tract.

In common with the general frequency of surgical tuberculosis there is a good deal of primary tubercle of the epididymis and testis generally.

The most usual cases of tubercle of the testis are those with a hard, tender lump in the epididymis and a much thickened vas deferens. One is almost certain to find a deposit in the vesicula seminalis, or the prostate, or both, of the same side. As in all forms of tubercle, the patient will not seek medical advice until his disease has progressed to an almost untreatable extent; and, although one is in the habit of performing castration and removal of as much of the vas deferens as possible, it has to be recognised that there are still portions of diseased tissues left, from any one of which the process may subsequently widely extend. Some cases, however, appear to do well after castration and remain quiescent for a considerable period. One very rarely finds a suitable case to attempt the removal of the testis and vas deferens by an incision over the inguinal canal, and of the vesicula seminalis and the affected portion of the prostate, through a curved transverse perineal incision just in front of the anus; for too often we find both sides affected. The question of operation is then much more difficult to decide, though it is quite justifiable to undertake the complete removal of the testes,

vesiculæ seminales and prostate if there is no evidence of tubercle in any other part of the body.

The operation of epididymectomy can have only a very limited application in Egypt, owing to the late stages at which the disease is met with and the extensive infiltration of the testicle.

I do not remember to have seen a case of tubercle of the kidney or bladder, though the presence of bilharzia of the bladder may have prevented the recognition of these conditions had they existed.

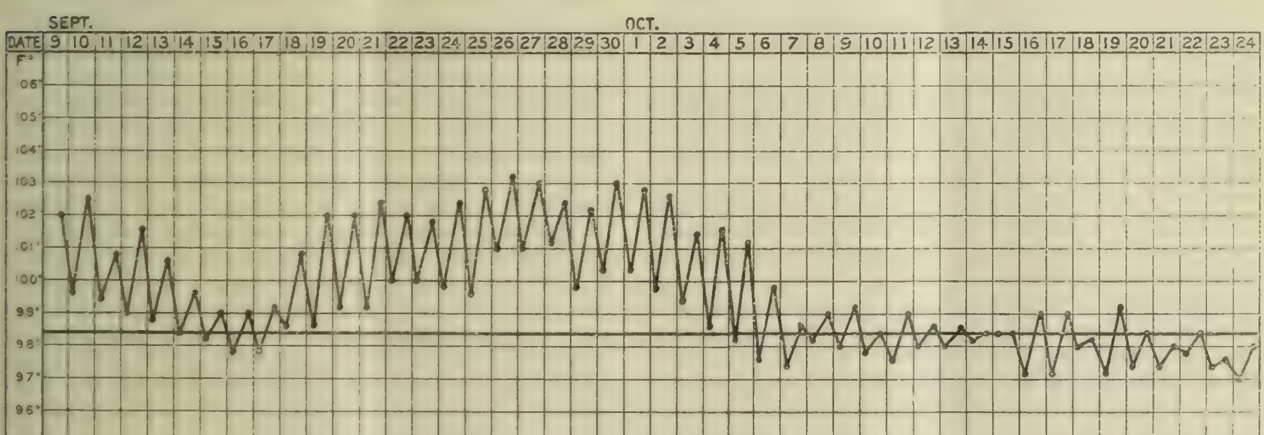
(6) Tuberculosis of the Peritoneum.

Primary tuberculosis of the peritoneum is fairly frequent. The most usual type of case is that with much matting together of the intestines, and especially with the formation of an omental mass. In treatment one is again very much handicapped by the general unhealthy state of the patient, and the progress the disease has made. In two instances, with much swelling of the abdomen, in which laparotomy appeared eminently suitable, the patients died suddenly before operation could be performed; one after a violent attack of vomiting. *Post-mortem* examination showed a tubercular ulcer, which had ulcerated through the intestine, and several others on the point of doing so. The whole peritoneum was studded with tubercles, and the peritoneal cavity contained a large quantity of ascitic fluid.

In the other case no *post mortem* was allowed, but I have no doubt that the cause of death was the same.

Another case of the kind had an umbilical fæcal fistula. On admission there was a central orifice discharging fæces at intervals; but in a few days' time several smaller fistulæ formed around the original centre. On *post-mortem* examination masses of tubercle were found in every abdominal organ. The greater part of the small intestine was infiltrated in patches, inside and out, and was adherent by thick lymph, dotted with tubercles, to the anterior abdominal wall. From the adherent portions of the gut many fistulous openings running to the umbilicus were seen, and a general chronic tubercular peritonitis, which was, however, only an incident in the general abdominal tuberculosis.

So hopeless is our task in so many cases of surgical tuberculosis in Egypt, owing to the advanced condition of the disease, that it is surely time something was done in the way of state legislation to cope with its ever-increasing ravages. A league for the distribution of knowledge concerning the prevention of pulmonary tuberculosis in Egypt has recently been organised, and it would be well to enlarge the scope of its operations to include surgical tuberculosis, in fact, tubercle generally. If only the lower classes of the native population could be educated to observe the ordinary rules of cleanliness of the body, and of the head in particular, good results might be expected to follow. But only those who come most in contac with this class of patient will appreciate the difficult ties in the application of any such measure. Certina it is, however, that if something is not done, and that soon, tuberculosis must come to be numbered amongst the modern plagues of Egypt, in the same category with syphilis.



Temperature Chart of a Case of Double Continued Fever.

CASE OF DOUBLE CONTINUED FEVER.

By V. Gunson Thorpe, Staff-Surgeon R.N.

The following communication was addressed to Dr. Manson:—

The accompanying chart of a case of double continued fever, which was lately under my care at the Royal Naval Sick Quarters, Wei-Hai-Wei, China, may probably interest you, and you may perhaps like to publish it, especially as the disease does not seem to be well recognised. It is the first case I have come across in the Service, and was very typical. This patient was a young officer belonging to a torpedo boat destroyer. The chief symptoms were headache, pain in the back, and sweating at night. Beyond these he suffered from no distress whatever. He served on the Mediterranean Station from 1897-1900, but never had Malta fever. I made a sedimentation test of his blood with a dead culture of the *Micrococcus melitensis*, but it failed to react. Microscopical examination of the blood showed nothing definite, though I found a very active bipolar bacillus, apparently in one of the blood corpuscles, and also what appeared to be a minute

non-pigmented malarial parasite. Quinine had no effect whatever on the temperature, nor did any other drug, such as salol, salicylate of soda, sulphate of magnesia, &c.

Before October 1st I had come to the conclusion that I had to deal with a case of your double continued fever, and I prophesied to the patient that the temperature would not rise again after it had fallen the second time, which turned out to be correct. He left to rejoin his ship on October 25th.

REMARKS ON THE INDIVIDUALITY OF "FILARIA DIURNA."

By Louis W. Sambon, M.D. (Naples).
Lecturer at the London School of Tropical Medicine.

(*Continued from p.* 384, *December* 15*th*, 1902.)

It is to be hoped that those who have the opportunity will lose no time in settling this interesting and important question.

While upholding the identity between *F. diurna* and *F. nocturna*, Drs. Annett, Dutton and Elliott suggest that the intermediary host of *F. diurna* is probably not *Anopheles costalis* or *Culex fatigans*, but some other mosquito of diurnal habits. This suggestion is incompatible with their premise. It is a well-known biological fact that a change in habits and hosts leads to the formation of distinct species.

Stegomyia fasciata, which is found in West Africa and which is known to be one of the intermediary hosts of *F. bancrofti*, may bite in the early afternoon from about 1 to 3 p.m.; but, as a rule, unless under cover, or on cloudy days, mosquitoes bite in the evening.

Some time ago Dr. Manson suggested that the so-called "Mangrove flies" might possibly be the intermediary hosts of *F. diurna*, and I believe this suggestion far more plausible.

I think that the intermediary host of *F. diurna* should be looked for amongst the Horse-flies (*Tabanidæ*), large blood-sucking flies with broad head, flat abdomen and strong legs, which bite during the warmest hours of the day. It is to these insects that the name of Mangrove flies is usually applied. Our knowledge of the *Tabanidæ* of West Africa is most imperfect. The collection of the British Museum contains very few species of this family from West Africa—*Tabanus fasciatus* and *Chrysops dimidiatus*. *T. fasciatus* is a reddish-brown fly about 16 mm. long; *C. dimidiatus* measures 10 mm. in length, and is likewise yellowish-red in colour. The genus *Erysops* derives its name from its golden-yellow eyes with purple lines and spots. A European species (*F. cæcutiens*) commonly called the blinding chrysops is so named because it prefers to bite the larger animals around the eyes. This peculiar habit is of interest in connection with the life-history of *F. loa*. Besides the *Tabanidæ*, there are other flies also called Mangrove flies; they belong to the family *Muscidæ* and are closely allied to the Tse-tse fly (*Glossina morsitans*). Of these, *Glossina palpalis* and *G. longipalpis* should certainly be examined. They are both greyish-brown in colour and measure from 9 to 10 mm. in length. These flies can be easily distinguished from all other flies on account of their prominent proboscis, which protrudes straight in front of the head. In the *Tabanidæ* the proboscis is rather short and vertical.

REPORT ON SPECIMENS OF TROPICAL INTEREST IN THE PATHOLOGICAL MUSEUM OF THE SCHOOL OF MEDICINE, CAIRO, EXHIBITED DURING THE EGYPTIAN MEDICAL CONGRESS.

The work of medical research in Egypt has assumed a practical shape of recent years in the form of a collection of tropical specimens at the School of Medicine, Cairo. The number of visitors to the museum during the Congress bears ample witness to the instructive value of its contents; and it may be of interest to give a brief account of some of the specimens there shown.

(*a*) The first and largest section of the museum is devoted to cases of *bilharzial lesions*, evidence of the extraordinary prevalence of this disease in Egypt. This series includes several specimens illustrating the early manifestation of the disease in the mucous membrane of the bladder: these show a yellowish or sandy discolouration deep in the mucous membrane, which is generally swollen; the discolouration and the change are both very well seen by the glycero-formol method of mounting the specimens. Here were also shown examples of bilharzial papillomata ranging in size from a small wart to extensive papillomatous degeneration infecting the whole bladder-wall and sometimes filling its cavity. The next two specimens, which are of great interest, showed an enormous thickening of the whole of the bladder, almost obliterating its cavity; in these hard fibrous masses were calcified patches of old bilharzial ova, and the ureters are very much thickened and dilated. Another specimen shows extensive destruction of the kidney by pyæmic abscess, the original focus of inflammation being bilharzial cystitis. Next to it was seen a right kidney transformed into a large hydronephrosis, owing to the blocking of the vesical end of the ureter by bilharzial papillomata; also a good case of early bilharziosis of the bladder and left ureter with some hydronephrotic change in the left kidney, the right kidney being congenitally absent. Two examples of primary bilharzial papillomata in the ureters were also worthy of notice.

In the same section were shown several fine examples of bilharzial papillomata of the rectum, colon, cæcum, and small intestine, the papillomata varying greatly in size and shape; these specimens acquire an added interest when it is pointed out that such papillomata are common only in the lower part of the large intestine, especially the rectum, and are very rarely found in the cæcum and small intestine. The next exhibit was a magnificent specimen of bilharzial ulceration of the colon. In parts of this specimen papillomata may be seen still attached to the mucous membrane, but with a red ring round their base. Dr. Symmers is of opinion that the

majority of these bilharzial ulcers have been produced by the separation of the papilloma at its pedicle by necrosis, the red line above mentioned representing the early stage in this separation. The whole colon is here shown thickly covered with ulcerations varying in size, but all circular in shape. The appearances and symptoms of this extensive bilharzial ulceration resemble those of dysentery.

Among numerous examples of bilharzial cirrhosis of the liver one in particular claimed special attention. In this specimen there was a very large perilobular increase of fibrous tissue containing a multitude of bilharzial ova. The credit of this condition rests entirely with Dr. Symmers who, being struck by the peculiar nature of the cirrhosis, prepared many microscopical sections, and was able to demonstrate bilharzial ova embedded in the fibrous tissue surrounding the radicles of the portal vein in each section. Although the frequent cases of so-called idiopathic ascites in Egypt are probably dependent on bilharzial cirrhosis, a definite causal relationship between them has not yet been established.

Another instructive case was that of a spleen exhibiting two whitish nodules on its capsule, these nodules containing bilharzial ova in large numbers.

In the series illustrating bilharzia of the female genital organs, one specimen showed all the signs of a typical urethral caruncle, which on section was found to be bilharzial in origin. A uterus was also exhibited which was removed by Mr. Madden by vaginal hysterectomy for what was apparently an early epitheliomatous cauliflower-like growth on the posterior lip of the cervix. Microscopical examination proved, however, that this growth was simply a much enlarged bilharzial papilloma, and ova could be seen extending right up to the surface epithelial covering. Two other specimens showed very large pendulous masses removed from either side of the orifice of the vulva and the anterior portion of the vagina; in these specimens the adult bilharzial worms could be seen *in situ* on the cut section. Attention was also drawn to a large papilloma removed by a wedge-shaped incision from the posterior lip of the cervix uteri of the same patient as that referred to in the preceding specimens. Photographs of the condition of the patient before operation were on view; and the patient herself, who still retains a patch of bilharzial tissue in the situation of the vestibule, the clitoris having been completely destroyed, was exhibited by Mr. Madden to the members of the Congress. The last specimen in the case devoted to bilharzial lesions worthy of special notice was a very interesting bilharzial fibroma of the broad ligament in a child of four years old.

(*b*) Among the specimens illustrating the general pathology of the *liver* was seen a case of an enormous cavernous angioma of the liver, in which almost the whole of a much enlarged liver had been transformed into cavernous tissue. Two contrast specimens—one of the angioma containing its blood, the other in which the blood had been removed by running water—were very clearly shown. A well-marked case of coarse cirrhosis with a history of malaria, and a good example of actinomycosis of the liver, were also conspicuous. A solitary case of ecchinococcus was exhibited; and it is an extraordinary fact that, in spite of the close domestic relations existing in Egypt between men and dogs, and their common access to drinking water, hydatid disease is only met with quite accidentally there. Similarly, though two very good specimens of amyloid disease of the liver were shown, this condition is very rare in Egypt, in spite of the great prevalence of syphilis and tuberculosis, and the accompanying suppuration of bone and other tissues.

On the other hand, owing to the fact of syphilis being so common and so much neglected in that country, it was only natural to see many specimens of syphilitic cirrhosis of the liver, and syphilitic gummata in and around that organ. There was also a striking example of a large abscess in the right lobe of the liver, in which, though the margin of the abscess was fairly well defined, there was an absence of anything approaching a fibrous limiting membrane.

(*c*) In the section devoted to *diseases of the kidney*, specimens of hydronephrosis from the blocking of various parts of the urinary tract by calculi were *en evidence*; and there were several noteworthy examples of congenital cystic degeneration of the kidney and advanced tuberculous disease. Of particular interest to tropical students were some specimens showing the intense pallor and anæmia of the kidneys resulting from severe ankylostomiasis, with one case of hæmorrhage into the pelvis of the kidney in the same disease. Mention must also be made of several examples of pyæmic kidneys resulting from calculus or bilharzial cystitis, and of a striking *post-mortem* specimen of a very large stone, which completely filled the bladder, with marked back-working changes in the ureters and kidneys.

(*d*) The series of *madura foot* specimens included two examples of the rare red variety of this disease. In specimens of recent date these sections are pitted with fine depressions, and scattered throughout the whole surface are seen innumerable small red granules, which, unfortunately, become almost immediately decolourised in the process of preparation; a deeper section, however, will again show the red granules. In both the cases above mentioned the destruction of all the structures of the foot, including the bones, was noticeable to a marked degree. The distinction between the separate bones had been almost entirely lost, the bones themselves having been converted into a substance resembling putty. The general contour was typical of madura foot in other varieties.

(To be continued.)

Treatment of Menstrual Suffering.

Professor Wm. Stephenson recommends for menstrual suffering—under which term is included amenorrhœa, menorrhagia, and dysmenorrhœa—two grains of permanganate of potassium administered in pill form thrice daily. Anæmia is not an indication for its use, and the drug can never be regarded as a "substitute" for iron. In chlorosis, however, permanganate of potassium has proved of service.—*Scottish Med. and Surg. Journal*, January, 1903.

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THE

Journal of Tropical Medicine

JANUARY 15, 1903.

THE EGYPTIAN MEDICAL CONGRESS. GENERAL REPORT OF THE MEDICAL AND SURGICAL SECTIONS.

MEDICAL SECTION.

THE subjects of dysentery and malaria occupied the attention of the Medical Section during the opening day of the Congress.

Dysentery.

A number of valuable papers, more especially from a clinical point of view, were contributed; and Dr. Kartoulis, of Alexandria, reviewed the literature of the subject in a comprehensive and thoroughly scientific manner.

Malaria.

The consideration of malaria elicited some interesting facts. Dr. Fornario, of Cairo, gave an account of work done in connection with malaria during the past century, and of his own researches. After touching on the phases of epidemics corresponding with the autumn rise of the Nile, Fornario went on to establish the connection, hitherto ignored, between heart disease and malaria. He also demonstrated by statistical tables, founded on numerous observations of malaria generally and the Rosetta variety in particular, that in ordinary malaria in Egypt the liver is much more often and extensively affected than in the latter type of the disease.

The consideration of malaria naturally caused frequent mention to be made of the work of Major Ross, who was unfortunately prevented from attending the Congress; and in this connection, Professor Mariani, of Genoa, reminded his audience that mosquitoes are not the sole agents in the transmission of malaria, and referred to the valuable researches in this disease conducted by the school at Rome.

Typhoid.

Dr. Courmont, of Lyons, followed with a paper on the presence of typhoid bacilli in the blood of persons infected with typhoid, and explained his new method of cultivating the germ. This gave rise to an interesting discussion, in which reference was made to the fruitful results of Professor Maragliano's clinical researches at Genoa.

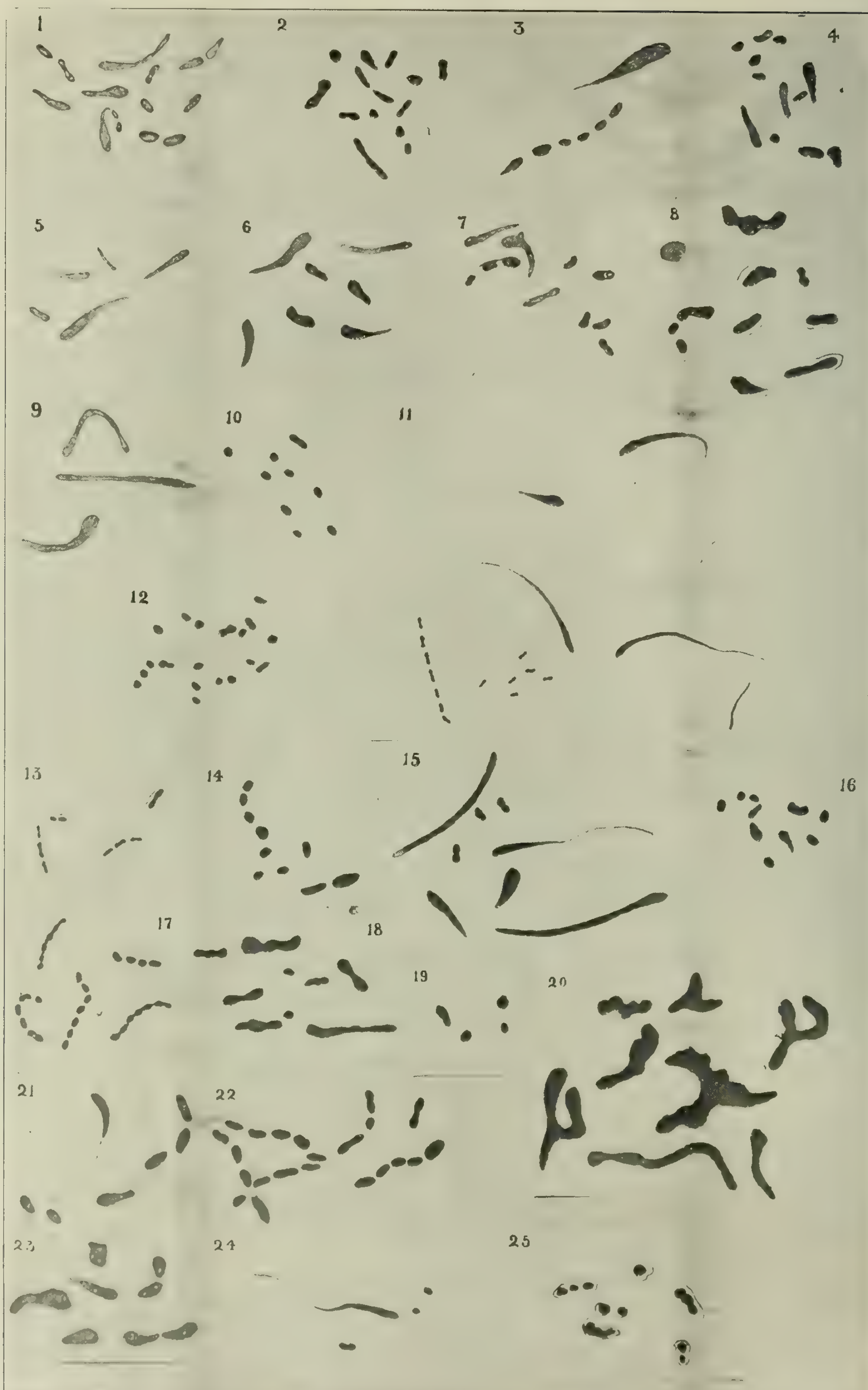
Plague and Cholera.

The consideration of plague and cholera was opened by Dr. Bitter, of Cairo, with a detailed account of the methods of dealing with epidemics in Egypt. He began with a review of visitations of plague and cholera in Egypt, the recognised home of epidemics in past centuries, and showed how recent outbreaks, especially that of 1902, had caused much smaller ravages than their predecessors. This result he attributes to the marked progress of science in the field of bacteriology of late years. After pointing out the misdirected efforts of the sanitary authorities in the past, he gave an interesting account of how cholera cases were traced to their source, and demonstrated the way in which the disease is spread by the Nile and also by canals, wells, and drinking fountains in the mosques.

A similar treatment of the question of plague was followed by a description of the successful efforts of the Sanitary Department under Sir Horace Pinching, which was warmly applauded. These results show that the best method of guarding the country against epidemics is to fortify it with sanitary measures, and in particular with those which aim at preserving the purity of drinking-water.

Dr. Bitter concludes that internal supervision and the application of the aforesaid hygienic measures are of more value as a defence against the invasion of epidemics than the establishment of quarantine regulations, which are generally inefficient.

An interesting discussion followed, in which mention was made of the increasing difficulties of the sanitary authorities in checking epidemics,



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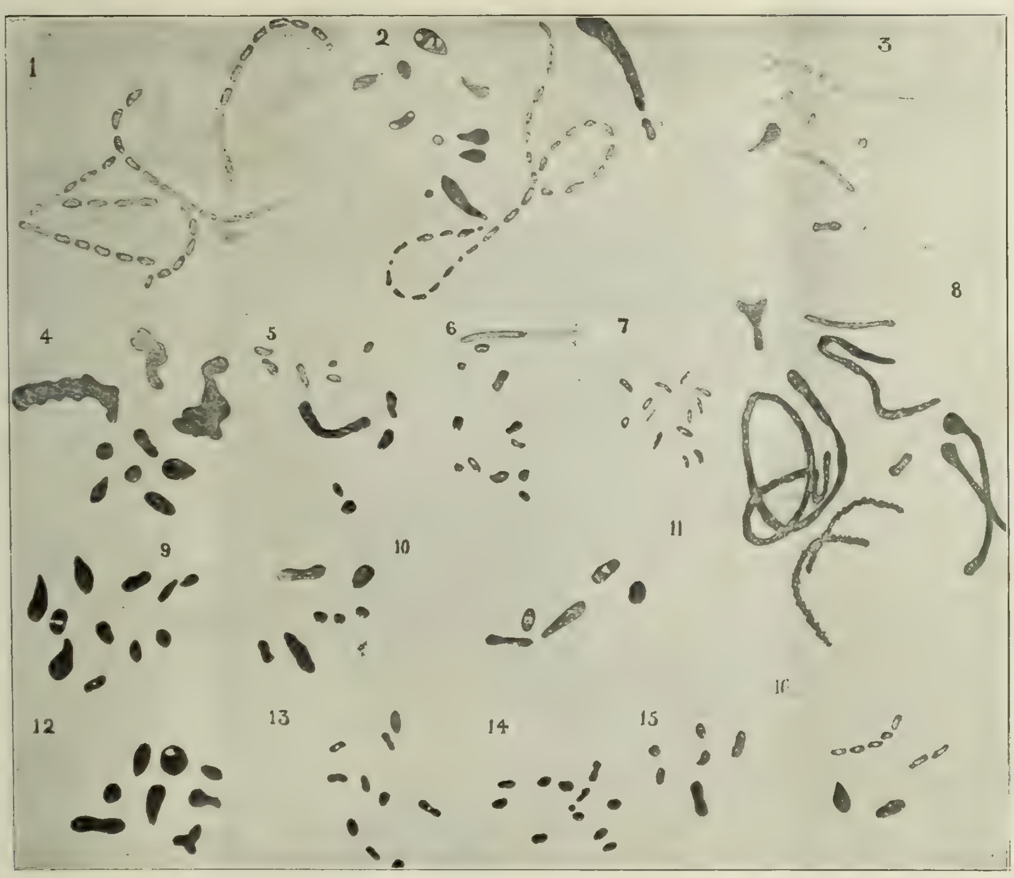

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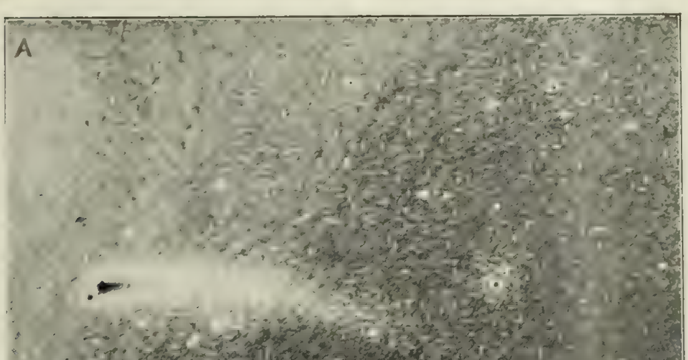

PLATE III.

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owing to the rapid growth of population in the large towns.

The work of the day ended with some scientific observations on plague in Egypt, presented by Dr. Gotschlich, of Alexandria. In the course of his instructive paper a distinction not generally recognised was drawn between the summer and the winter variety of plague. The former variety, as has long been established, is spread by rats; the latter, according to Dr. Gotschlich, does not attack them, and is entirely different, being pneumonic in character.

Tuberculosis.

"Tuberculosis in Egypt" was the title of the paper with which Dr. Ibrahim Pasha opened the fourth session of the medical section. The paper was confined, apart from a few general remarks, to observations on the climate of Egypt and its influence on tubercular subjects. His conclusions, which are of considerable interest, may be briefly summarised as follows:—

(1) The climate of Egypt is unfavourable to subjects of phthisical habit who are accustomed to a warmer climate.

(2) The climate of Egypt is favourable to phthisical Europeans whose native land is not situated at a high altitude.

(3) The most favourable season in Egypt for phthisical patients is from October to April.

(4) From April to October such patients should leave Egypt, in order to escape the excessive heat.

(5) Sanitary measures are urgently needed to prevent further spread of tuberculosis among the native population.

Professor Maragliano then gave an account of his method of treating pulmonary tuberculosis by antitoxin serum injections.

Leprosy.

In the discussion on leprosy, Dr. Engel Bey pointed out that the total number of lepers in Egypt to-day is small, in spite of the fact that isolation of lepers is not enforced. The conclusion is that transmission of the disease is rare, and that it probably depends on climatic conditions, such as cold and damp, for its circulation.

Ankylostomiasis.

The most important papers read at this section were undoubtedly those of Dr. Looss, of Cairo, and Dr. Stiles, of Washington, on ankylostomiasis. A preliminary notice of Dr. Looss's paper has already appeared in this Journal, and most tropical students are by now familiar with his discovery that ankylostoma larvæ can enter the human body by the skin. Recent experiments at Kasr-el-Ainy on dogs and human beings have amply confirmed this fact, which he originally discovered by accidentally allowing a drop of water containing ankylostoma larvæ to rest on his hand, and so infecting himself with the disease. The unique importance of this discovery was emphasised by Dr. Stiles, whose experience of ankylostomiasis led him to classify it among the diseases peculiar to sand areas.

Medical Work in Abyssinia.

Dr. Parissis Bey gave a report of medical work in Abyssinia, and explained at some length the methods employed there for dealing with malarial fever, syphilis, elephantiasis and leprosy. He concluded with the statement that he had never had to treat a case of liver abscess or tuberculosis in the natives, and that syphilis itself is uncommon there; while in the case of other diseases recovery is rapid, owing to the healthy climate which the country enjoys.

Attendance.

The meetings of this section were throughout attended by large numbers, and the greatest interest was taken in its proceedings.

Surgical Section.

Bilharzia.

In the Surgical Section the first day was devoted to the consideration of the various aspects of bilharzia. Professor Looss gave an exceedingly interesting and complete account of the life-history and characters of the parasite, and concluded by saying that, though he could not at present demonstrate the fact, he felt convinced that the mode of infection was by the skin, just as is the case with ankylostoma. Further, if the larvæ of bilharzia are brought, even momentarily, into contact with weak solutions containing acids, they were at once killed, and this fact rendered it impossible for them to pass the stomach if they were taken by the mouth. He was of opinion that the theory of an intermediate host, such as some mollusc, as had been so long suggested, was no longer feasible, as with the opportunities he had had of studying the parasite in all its phases in Egypt and the numerous possible hosts he had examined, all his search had proved unavailing. As regards skin infection, the difficulty was to find an animal whose skin resembled that of man, on which to make experiments; but from some partial successes he had had it was only a matter of time before his contention would be established. His results so far will shortly be published *in extenso* in a German publication. The experiment of this nature on man was so dangerous that he did not feel justified in attempting it till he was more certain of the behaviour of the bilharzia larvæ.

Dr. Ruffer was of opinion that it was hardly possible to have infection through the skin without the larvæ or worm producing some local lesion; but Dr. Looss, arguing from the behaviour

of ankylostoma, thought that the larvæ were so small and their transit through the skin so rapid, that a very transient effect was produced. In reply also to Dr. Ruffer, who had never been able to find bilharzia ova in calculi, Dr. Looss stated that he had constantly found them, though naturally they were often so much disintegrated that it was difficult to recognise them as such.

Dr. Goebel showed a number of specimens of bilharzia in various organs, many of the papillomatous tumours showing the adult worms in their substance. He also showed a portion of the colon which he had resected for bilharzia papillomata, a procedure which is hardly justified in the present knowledge of the intestinal manifestations of this disease. Many of the specimens described as cancer, associated with bilharzia, are at Kasr-el-Ainy generally considered as simple bilharzial tumours, consisting mainly of a hard fibrous tissue containing ova.

Dr. Symmers then gave an excellent demonstration of the pathology of the subject, illustrating his remarks throughout by showing many excellent pathological specimens, a full account of which has already been given in the notice of the Pathological Museum. Several of the extreme cases of bladder tumour bore a striking resemblance to those described as cancer with bilharzia by the previous speaker.

Dr. Talaat Mohamed gave some interesting particulars of the localisation of bilharzia, mentioning the case of two adjoining villages, one infested with bilharzia, the other exempt from it. For the rest the practical treatment of the subject was comprised in a lengthy paper by Dr. Frank Milton, the main points of which have already been published *in extenso* in our pages.

Taken altogether, the discussion on the subject did not elicit many facts of importance that have not already been recognised in the teaching of the subject at Kasr-el-Ainy.

Cancer.

Dr. Legrand, of Alexandria, showed a photograph of a negress whose breast he had removed for chronic scirrhous cancer; the case being of interest as proving that there are isolated cases of cancer amongst the black races, though the condition is undoubtedly very rare.

Tuberculosis.

Mr. Madden read a paper on "Surgical Tuberculosis in Egypt," illustrating the various points wherein it differed from similar conditions observed in England, and directing attention to the hopelessness of treatment in many cases, owing to the delay in seeking surgical assistance.

Abscess of the Liver.

The discussion on dysentery and liver abscess was not prolific in new ideas. The general facts of symptoms and pathogenesis were well presented by Dr. Kartoulis, who is one of the recognised authorities on the subject; and the surgical treatment of the condition was given at great length, and with much detail by Dr. Voronoff, who did not propose anything original, but contented himself with summarising the results of various Egyptian surgeons, all of whom were in favour of the open operation after resection of ribs, and almost generally condemned the use of puncture, unless the surgeon was prepared to operate immediately. The general opinion was in favour of an operation posteriorly, as low down as possible, and the suturing off of the pleura, before the diaphragm was incised, and the abscess in the liver opened. Some discussion took place on the propriety of scraping the cavity and removing the thick lining membrane; with but few exceptions the practice was condemned. The average mortality taking a large series of cases in Egypt was between 30 and 50 per cent.

Several cases of abscess of the liver in infants and children were recorded from various sources by Dr. Legrand; and Dr. Petridis described a method of exposing the anterior surface of the liver to permit of a free exploration of all parts of the organ, *à ciel ouvert*, and Dr. Voronoff stated that he had tested the efficacy of this method, and was surprised to find how satisfactory it was. A considerable length of the rib is resected on the antero-lateral surface of the chest over the upper portion of the liver, and a free opening is obtained by incising the intervening structures.

Many special methods of exploration and operation were described by different surgeons, but were such as not to meet with very general acceptance until the present methods are found wanting.

Urinary Calculi.

The discussion on Stone in the Bladder fell rather flat, the general consensus of opinion, ably put by Dr. Herbert Milton, being that in the great majority of cases, litholapaxy was the operation of election, and an instructive exhibit, shown by Dr. Frank Milton, of a series of several stones weighing from 6 ozs. to 18 ozs., treated by this method, attracted much attention. These stones were selected from the collections of Dr. Herbert Milton, Mr. Madden and the exhibitor.

Dr. Wildt and Dr. Morrisson described many successful cases by the suprapubic operation, but strangely enough, this operation is never performed at Kasr-el-Ainy if it can possibly be avoided, as it has been found that there is a great risk of subsequent sepsis, and extension of this mischief to the already inadequate kidneys.

A large collection of stones removed by the perineal route at Damanhour Hospital were shown, and the results gave ample proof that in the absence of the means for the proper performance of litholapaxy, the old perineal lithotomy still remains the most satisfactory treatment.

Urinary Fistulæ due to Bilharzia.

In the wards of the hospital, Mr. Madden showed a series of bilharzial lesions, including urinary fistulæ, affections of the bladder of various forms, and a very interesting case of a hard mass of bilharzial tissue in the abdominal walls. The patient was a woman, who was admitted with the abdominal tumour and a large stone in the bladder. This was removed by an incision in the suprapubic region which completely divided the tumour, which appeared to grow from the apex of the bladder, the main cavity of that organ being free from gross bilharzial infection. The tumour had completely infiltrated the whole thickness of the abdominal wall in this situation, and on section was composed of a firm fibrous tissue containing a few muscular fibres which had not yet been destroyed by the extension of the growth. The patient subsequently left hospital much relieved from her urinary symptoms, but the tumour had not diminished much, if at all, in size or hardness.

Cases of Leprosy, Ankylostoma and Pellagra.

Owing to the Congress falling in the month of the Ramadan fast, very few patients could be induced to enter the hospital; but by judicious management quite a number of lepers were present and were shown by Dr. Sandwith, who had also many cases of ankylostoma and pellagra on view.

British Medical Association.

SECTION TROPICAL DISEASES.

CONTRIBUTION TO THE STUDY OF B. PESTIS: ITS CULTURAL AND MORPHOLOGICAL CHARACTERS AND ITS RELATIONS WITH B. PSEUDO-TUBERCULOSIS RODENTIUM.

By Dr. Bruno Galli-Valerio.

Professor in the University of Lausanne.

The variability of the cultures and of the morphological characters of B. pestis may, in certain circumstances, render difficult its diagnosis. Every contribution to the study of the morphology of the B. pestis can but facilitate research. I have arrived at the conclusions I am about to state by the application of my own method of morphological study, the method I have been employing in the research of B. mallei.[1]

I have completed my study of B. pestis by making a comparison of the latter with the B. pseudo-tuberculosis isolated by me from a case of spontaneous pseudo-tuberculosis of guinea-pig.[2] This bacillus in a great many instances resembles B. pestis.

I shall study successively :—

(1) The characters of the cultures of B. pestis.

(2) The morphology of B. pestis.

(3) The comparison of B. pestis with B. pseudo-tuberculosis rodentium.

(1) Characters of the Cultures of B. Pestis.

The temperatures at which I cultivated the bacillus are 18°, 20° and 37° C. The cultures with which I have been working were better developed at 18° to 20° than at 37° C., and I am altogether of the opinion of M. Signières,[3] who disapproves the first culture of B. pestis at 37° to 38° C., at which temperature he often noticed that the bacillus did not at all develop. I have often observed that the culture at 37° was much slower in growth than at 20°. From the comparative experiments with B. pseudo-tuberculosis rodentium, we will see that the cultures of B. pestis are slightly developed at a temperature between + 1° and — 5° C. and removed after ten days to 20°, they are very well developed, a remark that agrees with the researches of the other observers, as Wladimiroff, Kressling, and Kasansky.

Let us now describe the characters of cultures of our bacillus in different media.

(*a*) *Gelatine.*—In a plate of petri at 20° we notice at the end of two days the appearance of whitish colonies of the size of a point of a needle. Microscopically they appear round, with entire or wavy borders of yellowish colour, finely granulated, and surrounded by a more or less clear zone on which the central portion seems to be slightly elevated. By pricking at 20° after forty-eight hours there appears at the surface a small spot hardly visible, whilst in the deeper portion there is nothing to be seen. Later on the spot becomes larger and larger and takes the form of a white patch of the size of about 1 mm., and in the deeper portion a white line is to be seen, at the borders of which we notice small colonies of the same colour of the size of a point of a needle. In the meanwhile the patch on the surface continues to increase in size; it is white in colour, its borders being wavy and presenting an aspect clearer than in centre.

(*b*) *Gelatine of Piorkowsky.*—In a plate of petri at 20° we notice some rare yellow granulated colonies with irregular borders, presenting often some prolongations. After five days some of the colonies from the surface spread, and present one prolongation and rarely two, as the tail of a comet. Microscopically they appear to be made up of a large colony, from which a number of other small round colonies seem to be projecting (fig. A, plate III.).

(*c*) *Agar.*—In a plate of petri at the end of eighteen to twenty-four hours there is an appearance of a colony of the size of a needle point, which at the microscope is finely granulated with irregularly undulated borders. By pricking in agar at 20° at the end of eighteen to twenty-four hours there appears at the surface a small whitish spot, which after forty-eight hours presents the size of 2 mm., with undulated borders, and the central portion being raised like a small button. In the deeper portion there is a whitish line with irregular borders, which is made up of a number of small round colonies. The surface spot increases in size, presenting a peripheral zone clearer than the central one, and at the end of two months some radiating lines.

(*d*) *Agar with Glycerine and Glucose.*—By pricking at the temperature of 20° at the end of eighteen

hours we notice a small development on the surface, and only after six days the patch takes the size of 2 mm. It presents the same aspect as in agar-agar, with the difference that it has no tendency for further development.

(*e*) *Bovine Serum Gelatinised on an Inclined Plane.*—At 20° at the end of eighteen hours there is the appearance of a punctuated line hardly visible. After six days the line can be better distinguished, and is formed of a series of small whitish colonies of the size of a point of a needle. Little by little the surface is covered by a whitish granular layer.

(*f*) *Pleuritic Fluid Gelatinised and on an Inclined Plane.*—At 20° at the end of eighteen hours presents the same characters as in the above medium; later on it develops as a fine white culture, formed of a number of colonies of the size of a pin's head.

(*g*) *Rabbit Serum Gelatinised and on an Inclined Plane.*—At 20° degrees at the end of eighteen hours a distinct development in the shape of a brilliant line of a pearly-greyish colour, and after three days presents a layer of a viscous greyish-white colour, made up of small round colonies. Often the development is much more rapid than in all the other media of culture. Gelatinised by pricking at 20° we notice on the surface a large whitish spreading patch or layer with irregularly undulating borders. After a month it takes the form of a leaf. The same serum liquid at 20° is troubled by the formation of a whitish deposit. As the formation of the deposit increases in quantity the liquid turns clearer.

(*h*) *Potatoes.*—At 20° at the end of eighteen hours no culture is distinguished; later on the surface turns shining and damp, and on scraping at the end of six days, the B. pestis is discovered. In a month's culture one notices some small whitish colonies of the size of a pin's head; even on successive cultures on potatoes at 20°, I could never observe a greater development in contradiction to Signières,[4] who by means of this method noticed characteristic pearly cultures.

(*i*) *Potatoes Glycerinised.*—At 20°, same characters as in the above medium.

(*j*) *Boiled Carrots at* 20°.—Same characters. By means of successive cultures the development is not increased.

(*k*) *Peptonised Bouillon at* 20°.—If the bouillon is recently prepared a thin film on the surface is to be seen and which is deposited in pieces at the bottom, the bouillon becomes clearer in appearance, having at the bottom a thick greyish deposit. But at the same temperature if the bouillon is old the thin film is not formed.

(*l*) *Peptonised and Lactose Bouillon.*—At 20°, the same characters and a small fermentation of lactose.

(*m*) *Peptonised and Glucose Bouillon.*—At 20°, same characters without fermentation.

(*n*) *Bouillon for Indol Reaction.*—By the method of potassium nitrite and sulphuric acid no reaction was noticed. By Crisafulli's method, with pine chippings, I noticed a slight reaction of indol.

(*o*) *Milk.*—At 20°, a good culture without any coagulation.

(2) Morphology of B. Pestis.

For the morphological studies of B. pestis I have employed preparations stained with different aniline colours, but especially the carbolic fuchsin of Ziehl. The Gram colouration gave a negative result. With that proposed by Neisser for diphtheria bacillus I observed in shorter form of B. pestis some dark grains placed at the extremities in the filament form, analogous grains scattered about.

Let us now study the different characters presented by the bacillus in various forms of cultures.

(*a*) *Gelatine at* 20° (figs. 1 and 2, plate I.).—In the cultures eighteen hours old we observe the shape of the bacillus is in the form of a cocoon of 3 μ, the form with a central clear space of 4-6-8 μ, the elongated form of 10-12 μ terminated sometimes in a club form, at other times a chain net of bacilli. After a month there are still the same forms and some new forms in the shape of a club, and curved forms and forms resembling cocci.

After two months and a half at the side of the oval and the straight forms some rare forms as curved filaments are seen.

Colonies on a plate of gelatine at 20° decalcated after seven days are made up of oval or cocoon-shaped bacilli uniformly stained, placed in parallel to one another.

(*b*) *Agar at* 20° (figs. 3 and 4, plate I.).—At the end of eighteen hours the same forms as in the gelatine, but with an increase of some of the bacilli forming a chain. After a month at the side of the same forms one notices some curved forms and other club forms of bacilli of the size of 14 μ. At the end of two months and a half a quantity of ordinary oval forms and of involutive forms.

(*c*) *Agar Glycerinised and Glucosed* (figs. 5 and 6, plate I.).—The same forms as in agar, but the old cultures present an increased number of involutive, irregular and thick club-shaped forms.

(*d*) *Bovine Serum Gelatinised at* 20° (figs. 7 and 8, plate I.).—At the end of eighteen hours a quantity of short forms almost resembling cocci, and especially oval forms with central clear spaces of the size of 2-3 μ. At the side of these, other forms, namely, club-shaped forms at times with a lateral bourgeon; the thick filamentous forms with clear spaces of 12-20 μ. At the end of a month we find particularly oval, club-shaped, spheroidal and streptococcal forms, and sometimes even filaments of 10 μ. A great number of these forms have a roseous aureola resembling a capsule.

(*e*) *Pleuritic Fluid Gelatinised at* 20° (figs. 9 and 10, plate I.).—Same aspect as in the bovine serum; in the old standing cultures there are sometimes some grains in the shape of a pear.

(*f*) *Rabbit Serum Gelatinised at* 20° (figs. 11 and 12, plate I.).—One notices in the beginning short forms in in the shape of cocci of 1-5 μ, oval forms uniformly stained of 2-3 μ and particularly oval forms of 2-3-4 μ with central spaces. By the side of these we find filaments of the size of 20-40-60-80 μ, straight, wavy, more often filled up at one extremity, never ramifying, but presenting sometimes false ramifications due to the juxtaposition of smaller filaments. Some of these filaments seem to be in a state of division, presenting an aspect of streptobacillus. At the end of a month we find short forms of 1-1·5, to 2 μ, several of which

are disposed in small chains composed of 5-6-7 elements.

(*g*) *Serum of Rabbit Liquid at* 20° (figs. 13 and 14, plate I.).—Oval forms with clear spaces, some of which disposed in chains. Both the isolated and the chain forms appear to be surrounded by a weakly stained aureola in the shape of a capsule. At the end of one to two and a half months the same forms as in the above medium.

(*h*) *Potatoes at* 20° (figs. 15 and 16, plate I.).—Cocoon-shaped forms, club-shaped forms of 6-8 μ, filaments of 20-40-50μ, at times filled up at one extremity. At the end of a month oval forms and specially round forms and thick irregular club-shaped forms.

(*i*) *Potatoes Glycerinated at* 20° (figs. 17 and 18, plate I.).—Cocoon-shaped forms and particularly very short oval forms like cocci, isolated or in chains composed of 5-6-7 elements. After two and a half months oval forms and several involutive forms in bead and dumb-bell shape.

(*j*) *Boiled Carrots at* 20° (figs. 19 and 20, plate I.)—Analogous forms as in above medium and in the old-standing cultures a number of elongated straight forms, beaded forms, club-shaped forms, sometimes ramifying; several of these forms seems to be the result of a fusion of a mass of degenerated bacilli.

(*k*) *Peptonised Bouillon at* 20° (figs. 21 and 22, plate I.).—Oval and cocoon-shaped forms, in small chains of 3-4-15 elements. At the end of two months a quantity of forms as cocci.

(*l*) *Lactose Bouillon at* 20°.—Same forms as in the above medium.

(*m*) *Glucose Bouillon at* 20°.—Same forms as in simple bouillon, but in old-standing cultures there are several involutive forms to be seen. A great number of these forms present vacuoles, and seem to be the result of the agglutination of degenerated bacilli.

(*n*) *Milk at* 20° (figs. 24 and 25, plate I.).—Cocci forms of 1·5 μ and cocoon forms of 3 μ.

At the end of a month the same forms with the addition of some club-shaped and beaded forms. At the end of two and a half months oval forms and involutive forms, round and pear-shaped. Some of these forms are surrounded by roseous-aureolar spaces like a capsule.

If we now consider the cultural and morphological characters of B. pestis, we can lay down the following facts:—

(1) The more rapid development of B. pestis at 20° than at 37°.

(2) The feeble development of the same bacillus in glycerinised and glucosed agar, in potatoes, potatoes glycerinised, and boiled carrots.

(3) A rich rapid development in the gelatinised serum of rabbits.

(4) A development in milk without coagulation, a slight fermentation of lactose and feeble indol reaction.

(5) Sometimes a characteristic culture in Piorkowsky's gelatine.

(6) With regard to morphology, my observation is that in every medium I tried I found by the side of typical forms also atypical forms; a fact that has been remarked by all the observers, and particularly by Skschivan[5] and Kolle.[6] If amongst the atypical forms several of these latter should be considered as involutive forms (since we find their presence in the old-standing cultures and especially owing to their irregular aspect and great dimensions), there are other forms that represent the evolutive forms of B. pestis, as I have already admitted the fact in my former work.[7] In fact, although in certain cultures I found at the beginning the club and filament forms, after a certain time these forms disappeared or became more scanty in order to be replaced by other normal forms which seemed to be their derivation. On the other hand, in certain other cases, as in the rabbit serum, the filament forms seemed to appear in the way of division.

In some cultures I remarked, around the bacillus, a zone feebly coloured by aniline, which could be taken for a capsule. It is the aureola mentioned by Kitasato and Yersin which is described as a capsule by Zettnow,[8] and which was sometimes found by Kolle[9] also.

In accordance with Loeffler, I do not consider it as a capsule since its presence is not constant; it is generally found surrounding the involutive forms only.

With regard to the spores described by Ibrahim Bey,[10] I never found any traces of them; I have rather observed in some old-standing cultures the presence of granulations strongly coloured by fuchsin, which Schultz[11] considered as condensed protoplasmic granulations appearing to serve as means for the conservation of the vitality of the bacillus. I have never remarked any movements of the bacillus, neither the presence of cells.

(3) Comparison of B. Pestis with B. Pseudo-tuberculosis Rodentium.

Amongst the bacilli that most resemble B. pestis, B. pseudo-tuberculosis rodentium occupies the first place. The fact that can determine, in a spontaneous manner in guinea-pig, lesions partly simulating those determined by B. pestis, could in certain cases give rise to a false diagnosis following an inoculation of material suspected of the bubonic plague to a guinea-pig that has been suffering from pseudo-tuberculosis. I have been, of course, engaged in comparing the two bacilli in their morphological and cultural characters, and at the point of view of the results following their inoculation.

(*a*) *Culture in Agar.*—By pricking two tubes containing agar, one with B. pestis and the other with B. pseudo-tuberculosis rodentium at 37°, we notice at the end of twenty-four hours that the two cultures present the same aspect and the same development; at the end of forty-eight hours the two cultures show on the surface a spot of about 2 mm., with irregular undulated borders and having the centre raised in form of a button. But that of B. pseudo-tuberculosis is whiter than that of B. pestis, and the now elevated portion is finely granulated like filigran. It is only at the end of ten days that the culture of B. pestis becomes slightly granular, but always in much lesser degree than that of B. pseudo-tuberculosis. This differentiation is no more possible if instead of at 37° we place the cultures at 20°, as B. pseudo-tuberculosis placed at 20° gives a culture without granulations like

Cultures in Agar of Hankin (3 per cent. of NaCl) by pricking at 20° C.

Characters of Cultures		Morphology	
B. Pestis	B. Pseudo-tuberculosis	B. Pestis	B. Pseudo-tuberculosis
At the end of forty-eight hours a small white button on the surface and thin whitish line in the deeper portion	At the end of forty-eight hours the surface of the agar covered by a series of small colonies of greyish-white colour, some of which fusioned together. In the deeper portion a whitish line with irregular borders.	At the end of forty-eight hours, ordinary oval forms with open spaces in the middle, and a number of chainlets of the bacilli, long and contorted	At the end of forty-eight hours, normal forms, several of which disposed in small chains. On the other hand there are some other forms twice or thrice as big, rather thicker, and slightly bent on themselves, and others, again, with clear spaces.
At the end of four days a greyish-white patch with a raised centre. Around this patch a series of smaller colonies of the size of a pin's point	At the end of four days whole of the surface of the agar is covered by a greyish-white patch with a series of small colonies at the borders.	At the end of four days the same forms, chains with false ramifications, short filaments, some short club-shaped and involution forms like cocci, pear-shaped, and like yeast	At the end of four days there are in addition some thick filamentous forms.
At the end of nine days the same characters, but the development much slower than that of B. pseudo-tuberculosis	At the end of nine days, idem.	At the end of nine days same forms, but the involution forms seem to be more rare (figs. 1, 2, 3, plate II.)	At the end of nine days there is a predominance of thinner forms of bacilli, straight or slightly curved, and some forms with a constriction in the middle (figs. 5, 6, 7, plate II.).

Cultures in Agar of Hankin (3 per cent. of NaCl) by pricking at 37° C.

Characters of Cultures		Morphology	
B. Pestis	B. Pseudo-tuberculosis	B. Pestis	B. Pseudo-tuberculosis
Small colonies of dimension of a pin's head on the surface; in the deeper portions a whitish line	The same characters, but slightly better developed.	Normal forms very rare. Involutive forms in great quantity, with varying and irregular shapes like yeast; club sometimes bifurcating heads (fig. 4, plate II.)	Normal forms very rare. A number of filamentous forms, simple or ramifying, contorted at times, bulging in the form of a club of 10-20-40 μ. No involutive forms identical with B. pestis (fig. 8, plate II.).

Cultures in Agar of Hesse by pricking at 20° C.

Characters of Cultures		Morphology	
B. Pestis	B. Pseudo-tuberculosis	B. Pestis	B. Pseudo-tuberculosis
At the end of forty-eight hours there is no sort of development on the surfaces, but a very slightly whitish line in the deeper portions. At the end of four days some small floccosities on the surface	At the end of forty-eight hours, appearance of a number of small whitish colonies, feebly marked line in the deeper portions. After four days the surface of agar covered with a whitish coating.	At the end of forty-eight hours, normal forms, thinner than those found in the agar of Hankin, some of which in small chains. Some shorter forms twice bigger than the normal forms; several involutive, in yeast and club-shaped forms. At the end of nine days the involutive forms increase in number (figs. 9, 10, 11, plate II.)	At the end of forty-eight hours, normal forms, uniformly coloured, thinner than those in the agar of Hankin, and a number of short forms as cocci. No involutive forms. Only at the end of four days appearances of involutive round or oval forms (figs. 13, 14, 15, plate II.).

Cultures in Agar of Hesse by pricking at 37° C.

Characters of Cultures		Morphology	
B. Pestis	B. Pseudo-tuberculosis	B. Pestis	B. Pseudo-tuberculosis
Whitish line in the deeper portion	Some small colonies on the surface and a whitish line in the deeper portions.	Normal oval forms and involutive forms, round, pear-shaped, &c. (fig. 12, plate II.)	Normal forms with clear spaces, isolated or in small chains. Involutive forms (pear or club-shaped rare) (fig. 16, plate II.).

B. pestis, and this latter gives at times, granular and radiating cultures. On an agar plate at 37°, at the end of twenty-four hours, colonies of B. pestis appear, under the microscope, with irregular borders without a central nucleus, whereas in the case of B. pseudo-tuberculosis the borders are round with a central nucleus.

(*b*) *Culture on Plate of Gelatine of Piorkowsky at* 20°.—At the end of twenty-four hours B. pestis yields colonies granulous with irregular borders of a dark yellow colour; B. pseudo-tuberculosis gives smaller colonies, round granulous, darker in the centre than at the periphery. Later still, several of the colonies of B. pestis present prolongations formed by smaller colonies having an aspect of a comet (fig. A, plate III.).

(*c*) *Cultures at Low Temperatures.*—Tubes with agar in an inclined direction having been treated with B. pestis and B. pseudo-tuberculosis were placed in a case filled with ice and were in winter fully exposed to the atmosphere, with a temperature varying between + 1° and — 5° C. At the end of fifteen hours the cultures of B. pestis showed a very feeble development, B. pseudo - tuberculosis on the other hand at the end of forty-eight hours only. Both the cultures remain stationary. After ten days both of these cultures were transferred to a temperature of 20°, and at the end of forty-eight hours they showed a great development. B. pseudo-tuberculosis presents a white culture, with undulated borders having an even line in the middle; B. pestis presents a white culture with borders more finely undulated having the middle line granular.

Inoculation in Animals.

It is a well-known fact that, if we touch the conjunctiva of a guinea-pig, the mucosa of the nasal fossa or its skin after having been shaved, with a loop of a platinum wire containing a culture of B. pestis, it gives rise to a marked manifestation of a typical bubonic lesion, so much so that these means were availed of by certain observers as a method for the diagnosis of the bubonic plague. I have made a similar experiment with a virulent culture of B. pseudo-tuberculosis.

For my experiments I have employed a freshly-prepared culture of B. pseudo-tuberculosis which was extracted from a guinea-pig dead of pseudo-tuberculosis. The above guinea-pig had been inoculated in the subcutaneous tissue with a 1 c.cm. of bouillon culture which was derived from a culture about a year old. This animal died after nine days, having had a marked œdematous infiltration, localised at the point of inoculation, having a chain of enlarged inguinal glands containing a purulent substance; there were also several white tubercles of the size of a pin's head both in the lungs and in the liver. Marked tumefaction of the spleen containing small tubercles of the size of a pin's head. With the cultures obtained from this guinea-pig I made the experiments that follow:—

(1) A small portion of the abdominal skin of a guinea-pig having been shaved is lightly rubbed up with a few drops of a bouillon culture of B. pseudo-tuberculosis. The animal perished at the end of thirteen days, and presents at the point of application above mentioned a fine coating, cracked at places, covering a humid and red surface, but no pus. Under the peritoneum, in the direction of the inoculation, I found a nodulous mass formed by a couple of tumefied glands surrounded by a bloody œdema. The lungs were white in colour, deeply infiltrated with some exudation and having some tubercles like a pin's head. The liver also contained similar tubercles. The spleen, four times bigger than its normal size, scattered with above-mentioned tubercles, was burst at one end and gave rise to a strong hæmorrhage.

(2) A guinea-pig is rubbed in the right nasal fossa with a sponge steeped in a bouillon culture. Ten days after there was a severe purulent rhinitis on the same side, which was at the same time obstructed. On the thirteenth day both the fossæ were obstructed, giving rise to a great difficulty of respiration. The animal died on the seventeenth day after the inoculation. On the necropsy the right nasal fossa obstructed by a sero-sanguinolent exudation, with tumefaction and hyperæmia of the same side. In the left fossa the same lesions, but in a much lesser degree. The submaxillary lymphatic glands were much enlarged, surrounded by a bloody œdema. There was no sort of lesion in trachea and bronchial tubes. Several small white tubercles of the size of a pin's head in the lungs, scanty in the liver. The spleen is greatly enlarged.

(3) In the right conjunctiva of a guinea-pig one let fall a few drops of the bouillon culture. The animal perishes the eighth day. On the necropsy there is a great tumefaction of the right submaxillary lymphatic with a sero-sanguinolent infiltration. Spleen much tumefied; a small white spot and one tubercle of the size of a pin's head at one of the extremities. This animal presented all the signs of a guinea-pig dead from the bubonic plague. I have also tried inoculations of the B. pseudo-tuberculosis on animals susceptible to the bubonic plague, but although a hamster inoculated with 2½ c.cm. of the above-mentioned culture died at the end of four days after the inoculation, manifesting a tumefaction of the spleen, with white spots in it and hyperæmia of the liver and small intestines, the mus rattus, mus decumanus, and the white rat showed no manifestation of any sort. The observations I have exposed above show with regard to B. pestis and B. pseudo-tuberculosis rodentium that there is a great deal of analogy, be it on the morphological point of view, be it in their characters of cultures, be it in the results following inoculations in guinea-pig. Notwithstanding this analogy the two bacilli can be distinguished from each other by a comparative study. In doubtful cases one should not hesitate to have recourse to all the different distinguishing methods I have just exposed above. The differential characters presented by B. pestis and B. pseudo-tuberculosis rodentium based on the study of the cultures I employed for my experiments can be summarily stated in the following table:—

B. Pestis.	*B. Pseudo-tuberculosis Rodentium.*
Agar and Gelatine Plates.	
Colonies with wavy borders, without nucleus.	Colonies round, with central nucleus.

B. Pestis.	*B. Pseudo-tuberculosis Rodentium.*
Piorkowsky's Gelatine Plate.	
Colonies with sinuous borders, without nucleus, often with prolongations.	Colonies round, with nucleus in the centre.
Agar by pricking at 37° C.	
Surface a smooth patch.	Surface a patch, fine grains.
Agar (Hankin 3 per cent. NaCl) by pricking at 20°.	
Small chains, involutive forms rare.	Chains rare, without involutive forms.
Idem at 37° C.	
Involutive forms very irregular, in great number.	Filaments—Involutive forms in lesser number.
Agar (Hesse) by pricking at 20° C.	
Some chains, involutive forms.	Involutive forms rare.
Idem at 37° C.	
Involutive forms in great quantity.	Involutive forms more scanty.
Milk.	
No coagulation.	Coagulation.
Mus Rattus and Mus Decumanus.	
Pathogenic.	Non-pathogenic.
Guinea Pig.	
Pathogenic.	Pathogenic.
Pseudo-tubercles rare.	Pseudo-tubercles more frequent.

All the figures have been drawn with a clear camera tube 16 oc. compensation 8 immersion homogeneous 2 mm.

Fig. A is almost the natural size.

Notes and References.

[1] *Cent. für Bakt.*, Bd. xxvi., No. 6, p. 177, 1899, and Bd. xxviii., Nos. 12-13, p. 353, 1900. [2] *Archives de Parasitologie*, vol. iv., No. 2, p. 288, 1901. [3] *Annales Pasteur*, 1901, p. 808. [4] *Annales Pasteur*, 1901, p. 808. [5] *Cent. für Bakt.*, Bd. xxviii., No. 11, p. 289. [6] *Zeitschr. für Hyg.*, Bd. xxxvi., p. 397. [7] *Cent. für Bakt.*, Bd. xxviii., No. 22, p. 842. [8] *Zeitschr. für Hyg.*, Bd. xxi., p. 165, 1896. [9] *Zeitschr. für Hyg.*, Bd. xxxvi., p. 397. [10] *La Méd. Moderne*, 1899, No. 75. [11] *Cent. für Bakt.*, Bd. xxix., No. 5, p. 169.

Correspondence.

To the Editors of the Journal of Tropical Medicine.

Sirs,—On p. 348 of the last issue of the Journal, in an annotation headed "Palestine," it was stated that "during the week ending November 1st, 494 deaths from *plague* occurred at Gaza and the neighbouring villages, 73 at Lydda and 5 at Jaffa."

No doubt these figures represented the *cholera* mortality in Palestine during that week. Fortunately plague is at present entirely absent from Palestine, and from all other parts of the Near East, with the exception of an occasional case in Alexandria, and a revival of endemic plague in the Assyr province of Arabia.

Cholera, on the other hand, is spreading rather seriously in Palestine. Up to the 11th inst., news had been received of a total of 1,531 deaths from the disease, distributed as follows: Jaffa, 13 deaths; Gaza, 971; Lydda, 277; Tiberias, 106; other places, 164.

Tiberias is the most northerly point yet reached by the epidemic. Consular reports announce that it has penetrated inland as far as the Ajlun district, east of the Jordan, in the Damascus vilayet.

I am, Sirs,
Your obedient servant,
F. G. Clemow, M.D.

Constantinople,
November 18th, 1902.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
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3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—FEBRUARY 2ND, 1903.

Original Communications.

PHOTOGRAPHS ILLUSTRATING THE PARASITES OF MALARIA IN A STAINED DEHÆMOGLOBINISED THICK-FILM PREPARATION.

By RONALD ROSS, C.B., F.R.S., F.R.C.S.

Professor of Tropical Medicine, University College, Liverpool.

For photographs see Plate.

IN the *Journal of State Medicine*, December, 1902, and the *Lancet*, January 10th, 1903, I described a very simple method by which the parasites of malaria can be obtained crowded together in preparations for the microscope. The method, to be brief, consists merely in staining, by any of the variants of the Romanowski process, a thick film or patch of dried blood, *without previous fixing*. It might be useful to publish photographs illustrating the results.

Photograph 1 (mag. 250).—Shows a field of one of my preparations as seen by a rather low power with good definition. There are three leucocytes in the field, and fifty or more small æstivo-autumnal "rings" can be seen scattered about in all directions. Many of them are of course out of focus owing to the thickness of the film; or are turned sideways, or at different angles to the plane of the cover-slip. In the preparation itself each parasite can be immediately recognised by its crimson nucleus and pale blue bioplasm, so that there is no possibility of mistake.

Photograph 2 (mag. 2250).—Illustrates part of the same preparation as seen by a high power (Zeiss Apochr. ol. immer., 2·00 mm.; and No 12 ocular). The nucleus of some of the organisms comes out as a dark spot.

Both photographs show how closely together the parasites may lie in such preparations, but I may add that the fields selected for the photographs were by no means exceptional as to the crowding of the organisms, and that the patient from whom the blood was taken was quite an ordinary case of malaria.

It is obvious that the same method can be employed for the detection of other blood parasites, as, for instance, trypanosomes, especially when they are scarce. Manson has already recommended a similar method for filariæ and flagellate bodies; but I think that it will prove useful for the smallest organisms—even for bacteria—and that it will facilitate their counting as well as their detection. Thus it is easy in my preparations to compare the numbers of malaria parasites present with the number of leucocytes. I am, however, carrying out further experiments in this connection.

Glasses giving high magnification and good definition are required for the identification of small amœbulæ and spores; and the student should satisfy himself by practice that his stains are effective.

THE RELATIONSHIP OF KALA-AZAR WITH MEDITERRANEAN FEVER, AND SOME DETAILS OF THE HÆMATOLOGY OF THE LATTER.

By P. W. BASSETT-SMITH, Staff-Surg., R.N.

Lecturer on Tropical Diseases, Haslar.

We are indebted to the Director-General Medical Department, Admiralty, for his courtesy in forwarding this important paper.

IN the JOURNAL OF TROPICAL MEDICINE of January 1st, 1903, Dr. C. A. Bentley has communicated a very powerful paper on the subject of kala-azar as seen by him in Assam.

After very exhaustively analysing the epidemiological, clinical, and microscopical features of the disease, with the serum reactions obtained in a small number of cases he comes to the conclusion that "whatever else it may be, kala-azar in essentially Malta (Mediterranean) Fever"; he also states that no detailed study appears to have been made of the hæmatology of Malta fever, beyond that Bruce gives the average number of red cells present at 3,500,000, this important subject having been neglected by most investigators.

It is, therefore, partly for the purpose of filling in this gap that I have thought it useful to bring forward a number of observations bearing on this point, made during the last three years while in charge of wards in this Hospital to a great extent given up to the treatment of cases of Mediterranean fever, so prevalent in the Navy.

Though fully appreciating the weight of the facts and arguments brought forward by Dr. Bentley, yet there appear to me to be some fallacies in the deductions. It

is true that the similarity of the course, the undulant and prolonged intermittent type of the fever, the rheumatic pains, and the sweats, bear a close resemblance to the undulant fever of Hughes, yet all these might be due to some other bacterial infection, giving rise to a chronic intoxication other than that produced by the *Micrococcus Melitensis*. That the specific cause is closely allied is highly probable, but there seem to be differences so marked, that it is difficult to think, as Dr. Bentley evidently does, that it is only an alteration of the effects brought about by the same organism, whose toxicity and infectivity have so altered as to produce such a wide-spreading fatal disease as kala-azar, and makes one wish for further confirmation of the serum reaction test, applied to a large series of cases, before definitely accepting the theory that the causative organism is the *Micrococcus Melitensis* of Bruce. We know, of course, that various races placed under changed local and climatic conditions react very differently to any particular organism; markedly for instance "Plague," at one place, so rapidly spreading and fatal, at another being more easily controlled and having a low mortality. We should therefore be prepared for considerable alterations in the results of an infection of the *Micrococcus Melitensis*, if introduced into a poorly fed, susceptible community of natives living in a hot climate.

The chief points of *difference* appear to be :—

(1) The greater degree of infectivity and more rapid diffusion.

(2) The high mortality.

(3) The more constant hypertrophy of the liver and spleen.

(4) The greater degree of emaciation and pigmentation produced.

(5) The absence of those neuralgias and peripheral neuritic symptoms, so important in Mediterranean fever.

The points of *similarity* are, the long course of irregular fever, the sweats, the rheumatic pains, the secondary anæmia, with epistaxis, &c., and the positive reaction of the serum in eight cases.

(1) With regard to the *infectivity* of Mediterranean fever, it is fairly well accepted that the disease can be found under a great variety of conditions, that it is not limited to the villages along the coast of the Mediterranean, where stagnation of sewage in more or less closed harbours is apt to occur, but is also prevalent in the villages situated in the more agricultural districts. That it is contracted without the patient having been in any known infected dwelling is evident by the number of men in the Navy who go down with the disease who have not landed for long periods before the onset; yet, on the other hand, one hears of ships, and even cabins in ships, which hold extremely bad reputations; that patients collected together in wards do not communicate the disease to the healthy, though cases may occur in the building, if in the endemic area (Malta Hospital), the disease being "endemic and sporadic."

In kala-azar, the disease is much more epidemic in character, marching from place to place as an immunity is established, but destroying large numbers as it goes, and being also markedly communicable from person to person.

(2) *The high mortality.*—There is no record of anything like the mortality of kala-azar in the districts in which Mediterranean fever is endemic. Dr. Bentley thinks that "interference with livelihood," is a possible explanation, but this does not, it seems to me, apply to children, who suffer so severely.

(3) *The hypertrophy of liver and spleen.*—Here we have one of the most important differences; the big belly and large organs are not found in the usual run of Europeans suffering from Mediterranean fever, and in the prolonged cachexia induced by the fever it is quite rare to be able to feel the spleen; even when percussed out during the febrile periods it is found to be only slightly enlarged, there being then a general congested condition of the organs.

The enlargement of the liver, too, is never of any great degree, either during the febrile attacks or afterwards.

(4) *Emaciation and pigmentation.*—In Mediterranean fever there is, during the protracted fever which may last, and often does, for four months without any marked intermission, as one would expect, a progressive loss of flesh and a general shrinkage of the tissues but in those long cases, where the intermittent mild form of fever with a temperature of 99° to 100° in the evening runs on to years, the patient never being quite well, the emaciation is not a very marked feature.

(5) *Neuroses.*—In almost all prolonged cases of Mediterranean fever the neuralgic pains are perhaps the most marked symptoms, singling out certain nerves and remaining with great persistency; in fact it is owing to the crippling effect of these attacks of neuritis that the greater number of invalidings from the Service are due, the toxin apparently selecting these tissues in preference to any others, and owing to the pain so produced there follows loss of sleep, loss of appetite, and a general despondency which protracts recovery so much.

(6) *Anæmia.*—With regard to the secondary anæmia found in Mediterranean fever, the importance cannot be too much borne in mind, for if the profound blood changes are once induced, it means that the patient will be more or less of a chronic invalid for years.

Generally speaking the changes are :—

During the actual febrile attacks a great reduction in the number of the red cells, which may fall to 2,800,000 per cmm., a loss of hæmoglobin of the individual cells, and alteration in size and shape, with a slight diminution of the white cells. During the following mild febrile cachexia there is a rise in the number of the red cells to nearly normal, but they are still very, very thin and deformed, microcytes being abundant, a reduced quantity of hæmoglobin is present, and generally numerous blood plates; nucleated reds I have never seen. The white cells also rise in total numbers, but it is seen that the relative number of the active phagocytic polymorphonuclear leucocytes is reduced, with an increase of the large mononuclear lymphocytes. There is no eosinophilia.

Further investigation proved that (1) not only are the active phagocytic cells much reduced in number, but that their phagocytic power also is diminished; (2) the useful products of these cells in the blood serum is deficient, and that the bactericidal properties of the blood are reduced, accounting for the frequency of

relapses and liability of reinfection if returning to an endemic neighbourhood. *Vide British Medical Journal*, September 20th, 1902.

A SERIES OF BLOOD COUNTS IN MEDITERRANEAN FEVER CASES MADE BY THOMA ZEISS METHOD, AND TAKEN ABOUT EVERY FORTNIGHT.

CASE.		RED.	WHITE.	
1	Acute with repeated relapses	3,800,000	6,600 per cmm.	
		2,800,000		
		3,200,000		
		4,700,000		Colour index 60 per cent.
2	Chronic case; mild relapses	4.800.000		
		4 800,000		
		4,340,000		
3	Acute case; repeated relapses, epistaxis, and otorrhœa	2,800,000	2,140	
		3,000.000	1,600	
		4,400.000		Colour index 55 per cent.
		5.120 000	2,240	
4	Chronic case ..	4.320.000	3,600	
		4 240,000	2,160	
5	Chronic case 18 months; acute relapse	3,280,000	4,960	
		3,500.000	4,800	Colour index 70 per cent.
6	Acute case; repeated relapses	2,720.000	2.400	
		3,200.000	5,700	Local abscess.
		4,640.000	5,600	Nephritis.
		4,320 000	5,600	Colour index 60 per cent.
7	Chronic case ..	6,000,000	5,360	
		5,200,000		
		5,200,000	4,600	Colour index 65 per cent.
8	Chronic cachexia 14 months	5,200,000	6,400	
9	Chronic cachexia 12 months	4,800,000	7,000	
10	Chronic cachexia 6 months	5,200,000	4,300	

TABLE GIVING THE RELATIVE COUNTS OF THE WHITE CELLS IN MEDITERRANEAN FEVER.

Case		Neutrophiles	Lympho-cytes	Eosinophiles	Per cent. of Neutrophiles	Remarks
1.	Acute ..	100	98	2	50	Poikilocytes and blood plates abundant.
		100	150	3	46	
		100	124	2	45	
		100	111	3	48	
2.	Chronic ..	100	45		69	Red cells fairly normal, few platelets.
		100	64	5	62	
		100	101	7	51	
3.	Cachexia ..	100	40	3	72	No marked anæmia.
4.	Acute ..	100	63	1	62	Marked anæmia and change in size and shape of red cells.
		100	75		58	
		100	92	1	53	
		100	83	2	55	
		100	83	1	55	
5.	Chronic ..	100	149	1	42	Great hydræmia.
6.	Acute ..	100	87	3	52	Great anæmia.
		50	52	1	49	
7.	Convalescent	100	68	4	76	No anæmia.
8.	Chronic ..	100	143	8	43	Great anæmia.
9.	Chronic ..	100	108	2	48	Great anæmia.
		100	92		53	
		50	69	4	44	
10.	Chronic; 2 years' duration	100	50	2	67	Red cells very irregular and pale plates abundant; great anæmia.
		100	74	5	58	
		60	72	1	48	
		100	75	6	57	
		100	62	1	63	
		100	65	4	61	
		100	96	4	52	

TABLE GIVING THE RELATIVE COUNTS OF THE WHITE CELLS IN MEDITERRANEAN FEVER—*continued*.

Case		Neutrophiles	Lympho-cytes	Eosinophiles	Per cent. of Neutrophiles	Remarks
11.	Acute ..	100	130	2	44	Profound blood changes
		100	165	3	39	
12.	Acute ..	100	125	1	45	Plates abundant, cells very pale.
		100	108	—	49	
		100	159	—	39	
		100	162	1	39	
13.	Cachexia ..	100	52	3	66	Little anæmia.
		100	34	1	75	
		100	37	4	74	
14.	Chronic ..	100	120	—	46	
15.	Acute ..	100	103	1	50	Cells pale, plates abundant.
		100	89	4	53	
16.	Chronic ..	100	72	1	59	
17.	Acute ..	100	94	—	53	Cells pale, irregular in shape.
		100	114	1	47	
		100	127	—	49	
		100	96	6	51	
18.	Acute relapse	90	109	—	46	Great anæmia.
		100	166	1	38	
		100	205	1	34	
		100	180	1	36	
		100	179	1	37	
19.	Chronic ..	100	103	4	49	Great anæmia.
		100	79	1	57	
		100	98	2	50	
		100	61	2	62	
20.	Acute ..	100	136	—	43	
	Chronic ..	100	86	—	60	Marked anæmia.
		100	72	3	59	
21.	Chronic ..	100	85	3	55	
22.	Mild ..	100	52	2	66	No anæmia.
23.	Chronic ..	100	112	—	48	Marked anæmia.
24.	Chronic ..	100	105	7	49	Marked anæmia.
		100	149	—	41	
25.	Chronic ..	100	148	—	41	R. C. very pale.
26.	Chronic ..	100	76	6	57	
27.	Chronic ..	100	84	2	55	

The average per centage of polymorphonuclear leucocytes in twenty counts of malaria with crescents present in the blood was 55 per cent.

In cachexia following malarial fever, where no parasites could be detected, it was about 58 in twenty counts. The average in six cases of tuberculosis of lung was 39 per cent.

The average of three normal bloods examined was 73 per cent.

The characters of the blood with regard to its cellular constituents are more or less common to most secondary anæmias, being found in phthisis and malarial cachexias, and are not, I think, of much value in connecting the disease of kala-azar with Mediterranean fever.

In conclusion, it appears that the case of the identity of the two diseases is "not proven," and until further corroborative evidence from serum reactions with the *Micrococcus Melitensis* is forthcoming, it would be well to still retain in our nomenclature the former as an independent disease.

WE congratulate Sir William Hooper, K.C.S.I., President of the Medical Board at the India Office, upon the well-deserved honour recently bestowed upon him.

ETHYL CHLORIDE AS A SUBSTITUTE FOR "GAS" IN THE TROPICS.

By J. Preston Maxwell, M.B., B.S., F.R.C.S.

Since arriving in China the writer has been impressed by the number of cases occurring in hospital practice where an anæsthetic similar to "gas" would be of great use; and "gas," by reason of the cumbrous nature of the apparatus and the difficulty of obtaining it in sufficient quantity, except at prohibitive prices, is out of the question.

Is there a reliable substitute? In working at this question some favourable notices of ethyl chloride came under the writer's notice, which led to a systematic trial being given to this drug.

In now recording the results no originality is claimed, but the matter is brought forward as one of sufficient interest to justify its being carefully discussed. Ethyl chloride, used as a general anæsthetic, may be given on a fold of lint, but the most satisfactory results are obtained by the use of a Brewer's mask.

For the benefit of those who do not know this apparatus, it may be said that it consists of a face-piece like that of a Clover's inhaler, with two valves; one for inhalation surmounted by an appropriate bulb for the exhibition of the drug, and one for exhalation. Both of these are of simple construction and work well in practice. Although the drug has been administered with the patient in a sitting posture, and no fatality is, as far as the writer knows, as yet recorded, still several cases of alarming heart failure have been noted, and it is better to administer it in the recumbent position.

The patient should fast for several hours previous to operation, and all due precautions should be taken. A piece of gauze having been inserted into the bulb and the latter warmed over a spirit flame, about 2 cc. of kélène (the pure commercial preparation of ethyl chloride) should be sprayed on to the gauze and the mask adjusted over the patient's nose and mouth. No air must be admitted except that charged with the drug. If air is admitted the patient may become very excited and the anæsthesia be only partial. The gauze in the bulb must be kept well supplied with the drug, and in one to two minutes the patient becomes unconscious, pupil semi-dilated and very sluggish, conjunctival reflex almost abolished, but the laryngeal reflex is not abolished: 6 to 8 cc. is enough for a fairly extensive operation, giving about three minutes of anæsthesia when properly administered. The patient awakes suddenly, as a rule has no nausea, and in a few minutes can walk away from the table.

At first the writer did not succeed at all perfectly, not having seen the drug administered. The first patient got too much air and struggled a great deal. The writer then lay down and administered it to himself, stopping the administration as he felt consciousness failing. In this case also too much air was taken in, and immoderate laughter under the anæsthetic was the result.

Later on he got his colleague to administer it to him for the removal of a carious bicuspid. The record is as follows: Breakfast as usual at 7.30 a.m. Hospital work thereafter till 10.30 a.m. At 11 a.m. lay down and took the anæsthetic, 7 cc. being used. Anæsthesia perfect. No pain or knowledge of the wrench. No nausea. Lay still for ten minutes, then got up and resumed work. At 12.30 p.m. had a hearty dinner.

Since obtaining the apparatus the writer has done many small operations under it. Old men take it well, especially if weak and debilitated. Thus, in a weak, broken-down old man, with acute suppurative synovitis of the knee-joint, arthrotomy was performed and a drainage tube inserted, without the man having to miss a single meal, or have the discomfort of post-chloroform vomiting. On another occasion, as an experiment, a young man, aged 23, with an ulcer of the leg, $1\frac{1}{2}$ in. by $1\frac{1}{2}$ in., was put under the anæsthetic; long Thiersch grafts were cut from the already prepared surface on the thigh and transferred to hot salt solution, the adjusting of the grafts being effected after he had recovered from the anæsthetic, the ulcer having been scraped well while the grafts were being cut.

When removing teeth a dental gag must be inserted, as the amount of relaxation is variable, and cannot be depended upon in any particular case. Occasionally there is slight tremor, but never, as far as I have seen, serious enough to interfere with the performance of an operation.

One caution must be given: If the patient is very excitable he may fight when in the sub-conscious stage. This only lasts about half a minute, but is quite long enough, in the case of a powerful man, to make it unpleasant for the anæsthetist.

In conclusion, the writer can heartily recommend this drug as a substitute for "gas" in the Tropics. It keeps perfectly well, can be obtained in graduated bulbs by post, and the apparatus is light and its parts are simple, and not apt to get out of repair.

MALARIAL FEVER IN THE ISTHMUS OF SUEZ.

By J. E. Cresswell, M.B.

Paper read before the First Egyptian Medical Congress.

In accordance with the request of the Committee for Tropical Diseases, I have prepared the following paper on the clinical types of malaria found, and the conditions under which that fever exists with reference to mosquito life.

My account is very imperfect, and I think the conditions found along the Suez Canal well deserve a minute detailed study by a trained malarial investigator. He will find there certain fixed conditions bearing on mosquito life such as he will see nowhere else.

(1) The district is set in an arid desert, and all life is limited to a narrow strip.

(2) A single canal with a few pools, drains, and marshes, limited in size and number, and changing hardly at all at different seasons.

(3) An absence of rain and rainwater puddles.

(4) A prevailing northerly wind, almost a trade wind, which blows for some 320 days in the year.

(5) A temperature which, taken month by month, varies little with its fellows of other years.

(6) A constant stream of persons infected with malaria coming from all parts of the world. In addition to the shipping trade of the Canal, some 30,000 pilgrims cross the Isthmus on their way to Mecca. They come from Northern and Western and Central Africa, from Turkey, Syria, Southern Russia, the Caucasus, and as far into Central Asia as Turkestan.

The history of malaria on the Isthmus falls naturally into two periods: that preceding the cutting of the canal, and that subsequent to it.

Before the canal was made, population was limited to the town of Suez and a few huts at the water-holes on the trade route to Cairo, and to the Delta and Syria. Suez itself was subject to occasional epidemics, strictly limited to the autumn, and in all fashions similar to the malaria which exists to-day at the water-holes and wadies on the Sinaitic Peninsula.

After the cutting of the maritime canal, and the growth of the two new towns of Port Said and Ismailia, with its accompanying supply of sweet water, conditions changed, and malaria has become endemic. It first took firm root at Ismailia, and radiating from that centre has become endemic all along the canal, following closely the sweet water canal.

The Types of Malaria.

These as seen in the wards of the Government Hospital, and in the patients coming from malarial parts of the Isthmus, are: (1) Benign tertian fever; (2) the æstivo-autumnal fevers.

Cases of quartan ague do not develop on the Isthmus to my knowledge, though they undoubtedly are seen in persons lately arrived from southern Europe.

(1) *Benign Tertian*

Is met with in all the year round, though it is most frequent between March and July; and very few cases of primary infection are met with in the autumn.

On examination of the peripheral blood, plasmodes are found in large quantities, as is described in all text-books. They stain easily and deeply with methyl-blue. The cycle of their development can be easily followed; but in every specimen a fair number of plasmodes, almost filling the entire corpuscle, are seen, which have irregularly scattered pigment.

In the sporulating stage I have sometimes seen the large number of spores usually described; but in most cases these have numbered not more than twelve. Sometimes the pigment does not form into one lump, but collects into ten or twelve small clusters, and the plasmode then has the appearance as if one cluster was attached to the edge of each spore. And in the same preparation I have found a small endo-corpuscular plasmode, showing a small ring with a stained nucleus at one edge, and a small lump of pigment at the opposite pole.

If this occurs in a case of mixed infection of malignant and benign tertian it is difficult to tell whether a plasmode of this form is either a young benign or a developed malignant tertian plasmode. The small size of the pigment and its absolutely peripheral position helps to settle the point.

The temperature chart of benign tertian may show either a continuous, a quotidian, or a true tertian fever.

The continuous type is manifest only at the commencement of the attack, and even then the temperature ranges two or three degrees between the maximum and the minimum. When the fever is continuous the infection is usually multiple.

The quotidian type due to double tertian is the commonest clinical form. In most cases of well-developed tertian the patient usually maintains that the fever was continuous at first, then of daily occurrence, and finally came on every second day.

In benign tertian the classic symptoms, rigor, hot stage, and sweating stage, are most regularly met with. The liver and spleen also enlarge, and here, as in other forms of malaria, when the spleen can be felt below the ribs, the fever is of more than ten days' duration, and the patient comes for quinine, and not for diagnosis.

Incubation.

Probably not less than five days. Last March a family consisting of a man, his wife, his mother and his son, slept two nights in an infected house; on the fifth day after their return to their own home the grandmother got a rigor, and I found a fully-developed tertian plasmode in the blood; on the seventh day the son went down; and on the tenth the man; the wife escaped entirely.

Relapses are very common in this form of fever. Thirty days is the longest time I have known a relapse to take place, where there was no fresh exposure to infection. The symptoms gradually subside after quinine; 1 gram daily suffices, but smaller doses should be taken for one month as a protection against a relapse.

(2) *Æstivo-Autumnal Types.*

By far the greater number of cases of malaria on the Isthmus are of this type. Cases are present throughout the year in the infected districts, and at no time are they absent from the hospital, one admission in every six being a case of malaria.

The season begins in March, when a few cases are met with, and continues throughout the summer, diminishing slightly in June and July. In August the cases perceptibly increase till towards the end of September. The maximum is reached at the beginning of November. By the middle of December the malaria season is over.

The average number of deaths per quarter for the last three years in the Suez district is seven for the first quarter, nine for the second, twelve for the third, and twenty-five for the fourth quarter. The district appears to me to have become progressively more malarious, and after a bad epidemic the number of cases met with has never fallen so low as it was previous to it.

The Blood.

From systematic examination of the blood taken every four hours in all cases admitted during the past

year, crescents were found in the great majority of cases. These were never found unless the symptoms had lasted for more than a week, generally a fortnight. The asexual form of plasmode in this type of fever was much rarer and more difficult to find.

The malignant tertian is the easiest to identify. On several occasions, to establish a diagnosis, I have found it in the blood drawn from the spleen, and in these cases only I have found it in any abundance. This plasmode stains fairly well with methyl blue, though not so well as does the benign form. It never filled the corpuscle more than $\frac{1}{3}$ of its diameter, and the corpuscles themselves were not markedly enlarged.

The amount of pigment to the size of the plasmode was always striking, and the pigment was generally gathered into one, two, or three lumps. The pigment was easily displaced in a carelessly prepared slide. In the sporulating form I have found it in splenic blood only.

The Temperature Curve in Æstivo-Autumnal Fever.

In the majority of cases the temperature curves were of the type generally described as associated with the malignant tertian plasmode. The paroxysm commencing with a rigor, the temperature quickly rises to 40° or 41°. Here it remains for eight or ten hours; it then drops to 38° or 39° in the course of the next ten hours. Here it remains for four hours or so; it then commences its second rise, not usually so high as the primary, but occasionally higher. After a few hours it slowly drops, and this time to normal, which point is usually reached some forty hours after the onset. A rigor sometimes accompanies the second rise, but whether this means a double tertian infection I am unable to determine. Usually the rigor is absent with the second rise, and in these cases the patient frequently describes the fever as coming on every third day. In cases under the influence of quinine, after the pseudo-crisis, the second rise is replaced by a period of maintained moderate fever, which drops to normal, likewise about forty hours after its onset.

Symptoms.

The symptoms which accompany the paroxysm vary in degree, though they are all usually present in every paroxysm.

It is the prominence of one certain symptom which gives the attack its character, and is, I suppose, responsible for the multitude of names with which malaria is blessed.

The vomiting so common with the onset of the attack, may become persistent and bilious in character; the so-called bilious remittent fever.

The slightly yellow tinge to the conjunctiva, noted after ordinary paroxysms, is here markedly accentuated. The chloreraic form is produced by gastric disturbance spreading to the intestines.

The rapid rise of temperature and the evolution of the paroxysm soon settles the diagnosis. There is one type of paroxysm not unusually seen, in which the respiration rate is greatly accelerated, the frequency reaching 40, 50, or even 60 per minute, the pulse ratio being 1 to 3, or 1 to 2. These are the cases described as "pneumonic," I presume. A careful examination of the lungs reveals a few sibilant râles at most.

Coma Cases.

These are seen every season, six or eight coming to hospital yearly. They are of every degree, from an exaggeration of the slight stupor which accompanies the heights of ordinary paroxysm to profound and fatal coma.

In mild cases the patient cannot be roused to answer questions, but feels pain, and the skin reflexes are present. The respirations are quick with a tendency to sighing. The sphincters are not relaxed, and were it not for the temperature, one would suppose the patient was under the influence of opium. The urine contains usually a trace of albumen.

In those cases ending fatally, the coma is more profound, respiration is stertorous, the sphincters are relaxed, and the pulse quick and running.

The cutaneous sensibility is the last to disappear.

The urine in fatal cases always contained albumen and sometimes casts; but the urinary system was so often the seat of long-standing disease from bilharzia, that I could never determine how far the uræmic element entered into the case.

It is in the peripheral blood of fatal cases that I have found the plasmode of malignant tertian fever most abundant; and I have got the impression that as far as Suez is concerned, fatal cases are always malignant tertian.

The algid forms I have only seen once, in the person of a coastguard recently arrived from the Soudan, where he possibly contracted the disease; the temperature throughout was normal. The hæmaturic form I have only seen in cases coming from East Africa, and none of local origin.

The incubation period may be short, as short as three days. A party of four went out shooting, staying out in the malarial zone for two hours after sundown. On the second day one of the party had a paroxysm with the double crisis, followed by a second similar one. On the same day another of the party developed herpes on the lips. Quinine being given in both cases at once, no plasmodes were found.

Quotidian Fever.

In not a few cases in which there has been a regular daily rise of temperature, I have only been able to find an endo-corpuscular parasite in the peripheral blood for a few hours before the rise of temperature. If seen at all it is fairly frequent, one or two in each microscopic field; it is situated near the edge of the corpuscle, it is generally single, but two may be present. The corpuscle is not enlarged, but I have seen it vacuolated.

The plasmode looks lighter than the corpuscle itself; it has a grey granular look, especially towards the edge, presumably from the very finely divided pigment; its size is not larger than $\frac{1}{6}$ the diameter of the corpuscle. It stains neither with methyl blue, formaline, fuchsine, nor methyl violet, and is best seen in a fresh unstained specimen.

When the temperature rises, the plasmode disappears from the peripheral blood.

The symptoms are generally mild. Besides the ordinary enlargement of liver and spleen there is

slight chilliness at the onset, and a very slight discomfort at the height of the fever, which may, however, rise to 41°. There is little sweating during defervescence.

Whether the parasite has a life-cycle of twenty-four or forty-eight hours I do not know. I have noted, however, that an injection of quinine given after the parasite has disappeared on one day affects the febrile access of the following day but little; while abolishing that of the third day. I have not found crescents nor seen pernicious attacks.

The incubation period of the quotidian type of fever I have not been able to determine; the attack commences insidiously, and the fever occurs more often in those parts of the town where tertian malaria is only met with sporadically than in the true malarial zone.

Irregular types of fever met with at Suez, and the so-called fevers of long intervals, accompanied by enlargement of liver and spleen, may be divided into (1) Tertian malaria, malignant or benign, with persistent relapses; (2) malaria complicating or following typhoid; and (3) perhaps Mediterranean fever. Fevers with long and irregular temperature charts are usually malignant tertian, where the dose of quinine is sufficient to modify the fever; but not to kill the parasite. This is especially apt to occur with children. The crescents I have noted in cases of æstivo-autumnal fever vary in size and thickness, and I have noted the variations in shape described by most writers. But I have not succeeded in diagnosing the type of fever from the shape of the crescent.

Though they undoubtedly persist in the blood longer than other forms of plasmode, there is usually a very close connection between the persistence of symptoms and the presence of crescents. This is specially true when there is some local cause for the temperature. I have not seldom seen cases where bronchitis, a persistent temperature, and crescents in the blood were associated; all three of which disappeared almost simultaneously on increasing the amount of quinine, or on the administration of arsenic.

The Sequelæ of Malaria which are seen on the Isthmus.

In addition to the inevitable enlargement of the liver and spleen, with its anæmia, I would place first, cardiac dilation produced by hard work before the heart muscle has recovered from the degeneration of the febrile period. The number of deaths from heart disease vary year by year, directly with the number of deaths from malaria.

Second, nervous affections. Insomnia is a common and troublesome symptom in Europeans after malaria. A form of neuritis, with tingling and numbness of the hands and feet; but without paralysis, or marked loss of sensation. It has a duration of from six weeks to six months, and is usually accompanied by great depression of spirits. True paresis I have not seen.

I have seen these nervous affections in patients who have taken neither quinine nor arsenic, and who have not been the victims of other diseases.

The Distribution of Malaria over the Isthmus.

This follows absolutely exactly the distribution of the Anopheles, who, in their turn, are confined to the narrow, limited region where the mosquito larvæ can develop in water which has percolated from the sweet water canal, and has formed small marshes, or has collected into ill-constructed open drains.

The power of the Anopheles to extend the disease is very distinctly affected by, firstly, the distance the breeding spots are from human habitations; and secondly, the amount of shelter which the adult mosquito has from the prevailing wind, to enable it to survive the period of thirty days, which is necessary, after it has sucked infected blood, to infect a human being.

Starting from the Port Said end of the canal: At Port Said no malaria develops, according to Dr. Orme, of the Government Hospital. There are no spots where it is possible for Anopheles to breed, no gardens to shelter them, and the prevailing wind is from the sea.

In that part of the canal between Port Said and Ismailia, a sweet water canal runs along a narrow strip of land between the maritime canal and the salt water lake of Menzaleh, till Kantara is reached (45 kilometres). From Kantara, onwards to Ismailia the canal runs some 8 kilometres from the maritime canal through bare desert, and parallel with the railway. The habitations on this section are confined to railway stations and canal signal stations, with the small village of Kantara situated where the Syrian caravan route crosses the canal.

Anopheles larvæ were collected near all these habitations to within 34 kilometres of Port Said, from pools which were, in every case, within 150 metres of the houses; in these houses cases of malaria occur, though not so frequently as in the other sections of the canal, owing to the scanty vegetation round the dwellings where the adult mosquito can shelter.

At Ismailia the state of things is different. Here, in addition to the canal of sweet water which passes through the town, we find a ring of marshes cropping up some 500 metres from the town. They are situated among sand dunes, and their united area does not exceed 10 acres. The largest of these, "Abou Raham," is partially drained by well-cut ditches, which abound in fish, and trees have been planted over the whole area.

The Europeon quarter of Ismailia is situated among well-laid-out wooded gardens. This quarter is infected with malaria; the native village, however, situated some 400 yards down wind on the bare desert, has few cases of malaria, Dr. Flood tells me.

Between Suez and Ismailia we find the sweet water canal running from 1 to 3 kilometres distant from the maritime canal.

There is a fringe of market-gardens on either side of the sweet water canal, and more or less continuous throughout its length. At the Suez end these gardens spread out in a fan-like shape, round the N. and N.W. of the town, approaching to within 200 metres of the outskirts. Every habitation in these gardens is infected with malaria. In every house in which I have searched I have found

Anopheles, and within 100 metres of every house I have found their larvæ.

The inhabitants of Suez town who spend a few weeks in these gardens in the summer, with few exceptions, become infected with malaria.

The dwellers in the stations on the maritime canal are practically free from malaria, though we find that each station has a small garden which is supplied with water by means of a cutting running from the sweet water canal. These cuttings are cleaned regularly in July, and the flow is rapid. We found no Anopheles in them.

In the town of Suez, wind-swept and with few gardens, malaria crops up in sporadic cases only. Very occasionally I have noted house epidemics, and here the houses had gardens attached or in close proximity. At Port Tewfik, situated 6 kilometres from the malarial zone, malaria fever is rarer still.

In both places Anopheles have been occasionally caught. In my own house, which is separated from the Anopheles pools by 1 kilometre of sea, I have caught three Anopheles in twelve months. And Anopheles have occasionally been caught in a dwelling 6 kilometres from the malarial zone, across open sea, and directly down wind. Here there was a case of regular fever last summer; no plasmode, however, was detected in the blood.

Anopheles Larvæ.

Between November and July these are only found in a limited number of favoured spots. From the middle of July, and for August and September, they overflow these limits, and are found in almost every pond and pool in the gardens along the sweet water canal. For the ten months when they are limited, the Anopheles pools have one point in common, that is, the total absence of fish. Fish are found all the year round wherever the water is in direct connection either with the sweet water canal above, or with the drains or marshes of any size below. Wherever this connection is maintained, small fry permeate to the very smallest rivulet; and here no Anopheles larvæ are found. If an Anopheles pool is connected with a fish-bearing drain the Anopheles disappear.

We found in the middle of June at the marsh of "Abou Rabam," which supplies Ismailia with its Anopheles, that the majority of the drains were well cut and teemed with fish. Where some of the smaller drains join a larger one, the mouth was sometimes blocked with dead leaves, which acted as a filter and kept back the fish out of the smaller drain; and here, and here only, did we find Anopheles larvæ.

Anopheles larvæ prefer water which has percolated through the land. They are indifferent to the amount of salt in the water. In two adjacent pools from which I took larvæ, one contained ·1 per cent. of salt, and the other 3 per cent. or half as salt again as ordinary sea water. These larvæ were hatched out after being placed in ordinary tap-water in the laboratory, and were of the same species.

Rate of Development.

I have not succeeded in hatching larvæ from the egg. In the larval stage, it is notably shorter in the summer than in the winter, if one may judge from the great number of pupæ which develop during the first four days in a sample of water containing larvæ of all sizes.

The pupæ stage, which can be more easily followed, varies from sixty hours in summer, with a room temperature of about 80° F. to eight days and even longer in the winter, with a room temperature of about 58°.

The Destruction of Larvæ by Fish.

Fish taken from neighbouring ditches and put into a collection of water containing mosquito larvæ did not sensibly diminish the number in the course of five days, at the end of which all the fish had died. On the other hand, the larvæ all disappeared in the course of a night from a bucket filled from the same source in which I had placed a couple of fish.

It is highly probable that fish exercise their greatest destructive power on the mosquito eggs. That they exert a powerful effect on malaria is, I think, certain. Dr. Flood, of Ismailia, noted a great mortality of the fish in Lake Timsah, Ismailia, caused, he thought, by flooding the salt lake with fresh water, and this state of things was followed by a bad outbreak of malaria at Ismailia.

I myself noted a great mortality of fish from some unknown cause in the sweet water canal and its tributary pools and marshes during the winter of 1898-1899. This was followed in the autumn of 1899 by the widest spread and most virulent epidemic of malaria which has yet occurred in the neighbourhood of Suez, and which did not abate till the following spring.

The cause of the larvæ appearing in fish-bearing waters must, I presume, be due to their more rapid development in the summer, and perhaps to the female laying a larger number of eggs in these months. It must, however, be noted that birds, the greatest enemy of the fully developed mosquito, have disappeared from the banks of the canal by the end of June, to return again in September.

Neither I nor Dr. Kaine, who hunted with me for Anopheles, were able to find their larvæ in the zers, or earthenware water receptacles, in malarial houses; though those of Culex were not uncommon. In Suez town, which is riddled with cess-pits, and is infested with the ordinary grey Culex which breed in them, I have been unable to find Anopheles among the mosquitoes which I have netted coming out of the ventilators of the cess-pits.

The *Stegomyia fasciata* is also a troublesome pest in the town; the latter breeds in the half filled wash-tubs and forgotten water-pots, where I have found their larvæ.

The adult Anopheles can be found in the day-time with a little care, in dark corners of malarial houses, usually near the floor; but it prefers spending the day among trees. I have seen quite a procession of Anopheles in the evening coming through the open window of a malarial house from the adjacent garden, and I have caught these with the blood in their stomachs. They dislike strong daylight and hide away under the foliage of the trees. I have captured them in the evening by shaking the branches of a tree apparently swarming with them, whereas on the following midday they were absent from there.

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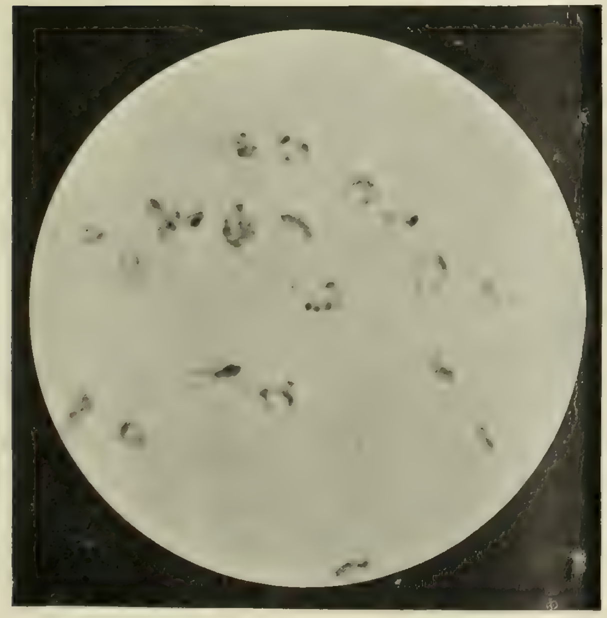

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Photographs illustrating the Parasites of Malaria in a Stained Dehaemoglobinised Thick-film Preparation.

By Ronald Ross, F.R.C.S., F.R.S., C.B.

Bale and Danielsson, Ltd., London.

The dispersing effect of wind in the absence of trees is well shown by a village, "The Arbaeen," on the outskirts of Suez, which has an Anopheles ditch immediately to windward of it. Many of the inhabitants of this village suffer from malaria, but those houses nearest the ditch suffer most. And at the Infectious Hospital, which is 400 metres down wind, no cases of malaria occur, even though I often sent cases of malaria out there to convalesce. In neither of these places are there any trees. So, again, the native town of Ismailia is denude of trees and is comparatively free.

The species of Anopheles I have identified with the help of "Theobald's Monograph," are (1) *Anopheles rossii*; (2) *Anopheles superpictus*. Dr. Flood tells me that at Ismailia, *Anopheles maculæpennis* has been identified.

Prophylactic Measures.

The only experience I myself have had is with the village of the "Arbaeen," where this summer the infecting drain was cleared out, and a free entry for fish established; this autumn the amount of malaria has sensibly diminished.

Petroleum as a Means of Destroying Larvæ.

While acting admirably against Culex breeding in cess-pits, it is not practical in ditches where sticks, leaves, and the wind break the continuity of the coat on the surface of the water. Where collections of water are small, they are easier filled in or emptied. The best policy appears to me to be to encourage the presence of fish everywhere, and give them access to all collections of water during the months when their breeding places are limited.

The advice given by Major Ross in his admirable book, "Mosquito Brigades," is very sound. But in this country the active co-operation of the cultivators is required; at present these latter believe that malaria comes from eating dates, "Date Fever" being their name for it; yet not one of them ever dreams of eating one date the less, and they cannot be induced to drain a marsh, or clean a ditch, six months before the fever season.

Another great obstacle to the extermination of Anopheles are cattle. These grazing in marshy ground leave hoof marks, which fill with water, where larvæ develop, protected from the fish of the neighbouring marsh.

At Ismailia the Canal Company have recently taken the fever question up seriously. And if with the best advice obtainable, unlimited means and a comparatively small number of infected pools, the Anopheles cannot be exterminated and the town freed from malaria, I do not think that measures directed against Anophele larvæ will be successful anywhere.

ON NAGANA AND OTHER TRYPANOSOMES.

By Dr. Schilling.

Medical Officer of the German Colonial Office, at Togo, West Africa.

Not long ago medical men regarded the reports about Surra, Nagana, Dourine and Mal de Caderas as interesting contributions to our knowledge of protozoic parasitism. These diseases were viewed with a certain academic interest as regards Colonial development, or from their affinity to human malaria, but human pathology had nothing to do with them. Within a few months the whole situation has changed. The report published by Dr. Manson in the September number of this Journal has proved that the first case of Trypanosoma in man, described by Dr. Forde, was not a unique one, but that a new area of investigation is opened to tropical medicine.

So it may be allowed me to give a short sketch of our knowledge of the diseases of animals caused by the genus *Trypanosoma*. I had the opportunity to study Nagana during eighteen months on the West Coast of Africa, in the German Colony of Togo. The result of these investigations is a method of immunising cattle against Nagana or Tse-tse fly disease.

All the diseases belonging to the group in question have this in common, they are caused by a parasite belonging to the lowest class of animals, the *Protozoa*, sub-class *Flagellata*, genus *Trypanosomidæ*. All the members of this genus are parasites of the blood plasma, never entering into the red corpuscles. Of this dangerous family there are also harmless members, living in rats, frogs and fishes. Common to all Trypanosomidæ is the general form, a slender, spindle-shaped, protoplasmic body, pointed at one end, drawn out into a long flagellum at the other, and with an undulating membrane along the body like the back fin of an eel. By special methods a nucleus can be stained; most of the species also show a micro-nucleus or centrosome. When in process of multiplication they divide. The division is exclusively longitudinal. An extracorporeal life has not yet been observed.

We know up to date five species of Trypanosoma pathogenic to animals:—

(1) *Trypanosoma Evansi* (Evans, 1880) causes the *Surra* in India; found also in German East Africa, in the Philippines and in Mauritius.

(2) *Tryp. Brucei* (Bruce, 1894), found in cases of *Nagana or Tse-tse fly disease*, in Zululand, South Africa and West Africa.

(3) *Tryp. Rougeti* (Rouget, 1896), the parasite of the *Dourine*, or mal du coït, in Algiers.

(4) *Tryp. Elmassiani*, so-called by Lignières, found by Elmassian in Paraguay, 1901, is the cause of the mal de Cadéras in South America.

(5) *Tryp. Theileri* (Theiler, 1902), was found in cattle in Pretoria.

These five species differ considerably; but it goes beyond the limits of this paper to enter into details of the question, whether some of them are identical or not. *Tryp. Theileri* at least is separated from Nos. 1-4 by its size, it being almost twice as long as the others.

Of all the diseases belonging to the group, *Nagana* has been most closely studied. So I think it desirable to give, in the first instance, a sketch of this epizootic.

The most striking feature of the Nagana in *horses* is the wasting of the body in spite of the undisturbed appetite most of the animals show. The first visible symptom is mostly a swelling of the legs and of the skin under the belly; in the stallion of the scrotum and prepuce. The general weakness increases, in some cases slowly, but in most instances the infection makes rapid progress and in a few weeks the victim breaks down and dies from exhaustion. Parallel with

the progress of the general marasmus goes the development of anæmia, which may only attain 25 per cent. of the normal amount of the hæmoglobin. As a consequence there is diminution of the activity of the heart and an abnormal permeability of the capillaries. Careful and repeated examination of the blood—best in fresh preparations—will never fail to show the parasites in varying numbers. The fever type is generally a remittent (5 to 7 days *after inoculation*). The temperature rises within two days to a high degree (41° C.); after a few days it falls as suddenly as it rose, and after a few days of normal temperature a similar attack returns. The course of temperature therefore, shows a great resemblance to malaria, only the attacks as well as the intermissions are of longer duration than in tertian. There is a nearly perfect parallelism between the movements of the temperature of the body and the relative number of parasites contained in the peripheral blood. When the Trypanosomes were very few in the blood I was always able to find them in the bone marrow. This throws a light on the pathology of Nagana; the blood-forming organs are the very seat of the parasites from which they pass into the blood, and where they form their toxins.

The *morbid anatomy* of Nagana is unsatisfactory; in addition to the evidences of anæmia there is an enlargement of the spleen and hæmorrhages under the serous coating of the heart and lungs, conditions which we also find in other infectious diseases. A case of recovery proved beyond all doubt is not unknown to me. Lingard gives the description of a case, where he treated a horse successfully with arsenic. But in criticising such cases it ought to be kept in mind that the parasites can be hidden in the affected body for months, perhaps for years, that the animal regains a good deal of its natural strength, and that therefore a recovery may be simulated: the truth will be proved by inoculating the blood of such an animal into dogs or rats; so long as a repetition of this experiment reveals the presence of parasites complete recovery is not established. The *duration* of Nagana varies considerably. Artifically infected horses die after about fifty days. The natural infection can have a more chronic character under certain circumstances, as described above. In such chronic cases one might try treatment by drugs; in more acute cases arsenic does delay the fatal end for a certain time, but does not prevent it. Quinine and other drugs have no effect.

Asses are subject to Nagana perhaps even more than horses.

In *cattle* Nagana runs a more chronic course than in the horse, and a rapid course of the disease is rarer. The only characteristic symptom is emaciation. Œdema is mostly absent; the appetite is nearly always undisturbed; pregnant cows often miscarry. The result of a *post-mortem* examination shows nothing characteristic. The examination of the blood for parasites is often negative, and the amount of Trypanosoma in the peripheral circulation is never as high as in the horse. By inoculating highly susceptible animals with blood in which microscopical examination had failed to detect parasites, the existence of the infection can be proved.

But there are reports given by Koch, by Noccard and Laveran, and by myself, that after artificial inoculation the parasites appeared in the blood for a short time, but soon disappeared again, and that after some weeks they could no longer be demonstrated by inoculating blood from the infected cow into sensitive animals. Consequently these test animals had completely recovered. This is a very important fact, considering the principle of immunisation to be described afterwards.

Of the *smaller* animals I will only mention dogs, rats and mice, which are all very susceptible to Nagana. Dogs form, after intraperitoneal injection, large quantities of exudate, containing great numbers of parasites in all stages of development. We are thus able to obtain material for experiment without admixture of blood.

In experimenting with these and other animals, we arrive at the conclusion that the parasite of Nagana has the quality, in a rather high degree, of accommodating itself to its host. The differences in the results obtained by the several investigators in Africa and Europe, are, in my opinion, not caused by the existence of different species of Nagana parasites, but by "tribes," as we call it in bacteriology, which by passing through a different number of different animals had in this way been "turned into another pitch." Thus, for instance, Laveran (Paris) works with parasites, which are able to kill rats, white and grey mice in about five days. A tribe cultivated by myself by transferring it about twenty-five times from dog to dog kills rats in about four weeks, and is not able to kill grey mice within three months. If we maintain this quality of the *Tryp. Brucei* to change its virulence according to the species of host, together with the experience that cows can recover from an artificial infection, we are led by a simple consideration to combine these two circumstances in directing a plan of experiment aiming at *a method of immunising cattle against Nagana*.

In 1901 Robert Koch was the first to publish the case where a cow in East Africa was inoculated with parasites of Nagana (or Surra, for he thinks that these two diseases are, if not identical, at least very nearly related) which had previously passed through the bodies of a dog and a rat. The animal was inoculated afterwards many times with blood containing numbers of parasites, but it was not possible to find them in the blood again. The cattle Noccard and Laveran and myself experimented with were also infected by parasites, which were taken from animals other than cows. I was able to begin experiments on a larger scale in Togo, during 1902, which are not yet closed, and are being continued. We are entitled to say that at least the principle of immunisation against Nagana has been discovered; to find out the most certain method will be the object of further experimental work. Further investigations however, will be necessary before extending this principle to horses and asses.

We may return now to the other Trypanosoma diseases named above.

Surra corresponds in nearly every point with Nagana, so much so that I doubt whether we are entitled to regard it as different from the latter. My opinion is that both epizootics have a common origin,

and are only influenced by climate, by preponderance of a certain race of animals subject to each, and by different kinds of transmission in respectively different hosts.

This latter point seems to separate the *Tryp. Rougeti* of *Dourine* from the others: Dourine is transferred only by coition. Both symptoms and pathology show a striking general conformity. For instance, the same urticaria-like rash described in Dourine has has also been seen by Lingard in Surra.

The same may be said about the *Mal de Caderas* in South America. The parasite, *Tryp. Elmassiani*, shows only a slight morphological difference from Nagana, and the most striking symptom, the paralysis of the hind-legs, which gave to the epizootic the name "hip disease," has been seen by me in a most pronounced form in a case of Nagana.

Tryp. Theileri seems to form a species by itself: up to date we must take it for granted that this "gigantic" Trypanosoma cannot be inoculated into animals other than cattle. I saw in Togo in one single case—in an apparently healthy cow, a Trypanosoma, which corresponds with the specimen of *Tryp. Theileri*, which was kindly shown to me by Professor Laveran.

Finally, a few remarks about the *transmission* of the Trypanosoma. The method of propagation has only been undoubtedly proved in Nagana and Dourine. Bruce was able to transfer the disease to healthy animals, by allowing them to be bitten by so-called "tse-tse flies" (*Glossina morsitans*), which had previously sucked the blood of animals suffering from Nagana. The transmission of Dourine by coition has been proved several times by Buffard and Schneider.

The analogy of the double cycle of the malaria parasite suggests the probability that *Tryp. Brucei*, also, passes in the tissues of the tse-tse fly, through a stage of development different from the stage we find in the blood of a sick animal (simple longitudinal division). If this be true, we must consider that the parasite may be introduced by the bite of the insect into the new host in another form than that in which it is found afterwards in the blood.

The fly resides specially in underwood, and in the neighbourhood of water. There are three different species of tse-tse flies: *Glossina longipalpis* (= *morsitans Westw.*), *Glossina tachinoides*, and *Glossina tabaniformis*. Which of these, or if all three, are able to transmit the disease must be ascertained by special experiments in places where these species are present. According to my observations, transmission by other blood-sucking flies, by fleas, or by ticks, can be excluded.

Everyone who has travelled through a tse-tse fly district will agree with me if I affirm, that measures to protect cows or horses against the bites of these flies will be powerless against their thirst for blood.

We may expect that in consequence of the interest the cases of Trypanosomosis in men, referred to at the beginning of this paper, have recently excited, that the whole group of Trypanosomes will be the object of the keenest study; and that the progress which we have made in the last years, and which I have tried to indicate in outline, will be followed by the definitive elaboration of a certain and effective method of preventing these dangerous diseases in animals as well as in men.

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THE

Journal of Tropical Medicine

FEBRUARY 2, 1903.

SECTION OF TROPICAL DISEASES AT THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

THE medical men of Swansea who are organising the meeting of the British Medical Association for this year cannot see their way to allow of a special section for Tropical Diseases. This is to be regretted, and no doubt many men practising in the Tropics will be disappointed. At the Council Meeting in January it was forcibly represented to the Association authorities that no section was better attended than that of Tropical Diseases during the past five years, and in no section was more good work done. A motion to the effect that a section of Tropical Diseases should be held was ruled out of order. It was suggested that the papers on Tropical Diseases might be sent in to the section of General Medicine; but it was pointed out that during the past five years

the section of Tropical Diseases could never get through all the papers sent in to be read, and that any such course as that proposed was futile. It may interest practitioners and scientific workers in the Tropics that we are not letting the matter rest, and that by our next issue we hope to be able to place before them a definite scheme for holding a meeting at which tropical diseases may be discussed. Efforts are still being made to induce the authorities to alter their minds, but in any case a meeting will be certainly held at some important centre.

REPORT ON SPECIMENS OF TROPICAL INTEREST IN THE PATHOLOGICAL MUSEUM OF THE SCHOOL OF MEDICINE, CAIRO, EXHIBITED DURING THE EGYPTIAN MEDICAL CONGRESS.

(*Continued from p.* 26.)

Madura foot.—In the surgical section several examples of the black variety of madura foot were exhibited; in one case the disease had advanced nearly up to the knee-joint, in the form of black columns extending up in the intermuscular connective tissues. Photographs of madura foot cases, and of an interesting red mycetoma of the upper part of the thigh, were shown by Mr. Madden at one of the meetings. Two examples of the madura foot of the white variety were lent by Dr. Bitter for the Congress, and were very good specimens.

The *lung* section contained good examples of general broncho-pneumonia (a disease which is so often met with in congenital syphilitic foundlings in Egypt), as well as many interesting specimens of various pneumonic conditions of the lungs, such as advanced pulmonary tuberculous syphilitic manifestations, especially gummata of the lung; one case of great interest showed advanced chronic tuberculous disease of the lung with a large clot *in situ* in a bronchiectatic cavity.

Attention was then directed to two specimens of *hearts* showing very extensive tubercular pericarditis, and a case of a similar condition occurring in a baboon, the sacred ape of Egypt.

These were exhibited also by some good examples of malarial, leucocythæmic, tuberculous, syphilitic and malignant diseases of the *spleen*; the most interesting perhaps being one of conversion of a much enlarged spleen into a cavity. resulting probably from necrosis of a leucocythæmic organ.

Among the specimens of *intestinal diseases* the most noteworthy were a duodenal ulcer of which the pancreas formed the floor, and a cæcum in which multitudes of oxyurides were attached to the mucous membrane, being particularly numerous at the orifice of the vermiform appendix. Specimens of tuberculous disease, one in particular showing tuberculous masses scattered over the external surface of the stomach, were also exhibited, together with some good examples of dysenteric ulceration of the colon; the latter aroused special interest as contrast specimens to those of bilharzial ulcerations in this situation which have been already described.

In the adjoining section three specimens of *elephantiasis* of the scrotum, consisting of large, thick slices of tissue, showed very well the various pathological forms which elephantiasis takes in this situation. In one case recently removed by Mr. Madden, which weighed thirty-seven pounds after removal, the structure resembled that of loose fibrous tissue, much of which had undergone a form of colloid degeneration; photographs of the patient were also exhibited. The second case seemed to consist mainly of adipose tissue; while the third had the structure of a hard fibrous tumour.

Among the *skull* and *brain* specimens a very interesting case of multiple sarcoma of the brain and a beautifully-mounted specimen of pachymeningitis hæmorrhagica were prominent, as well as some examples of tuberculous and syphilitic diseases of the skull with accompanying brain lesions.

In the section devoted to *tumours* three very interesting cases of sarcoma of the *thyroid* gland—a condition unfortunately very common in Egypt—and ordinary cases of *bronchocele* were exhibited. Attention was also drawn to two specimens of sarcoma of the nose removed by Mr. Madden, photographs of which, together with a description, have already appeared in the JOURNAL OF TROPICAL MEDICINE, and two very good examples of scirrhous cancer of the male mamma. A very large cysto-adenoma of the *kidney*, probably of the nature of suprarenal cyst, which had been successfully removed by anterior nephrectomy by Mr. Madden, made a very good specimen, and was accompanied by a photograph of the patient. Many examples were shown of extreme cases of tumour, which are very frequent in a country like Egypt, where patients do not seek medical treatment unless in an advanced stage of disease; but up to the present the museum has been unable to obtain a specimen of carcinoma arising among the black races.

Among the specimens of diseases of the *female genital organs*, the most prominent were some examples of extensive syphilitic fibroid induration of the ovaries, a case of advanced tuberculous salpingitis, a dermoid cyst of the ovary with hair and teeth, two specimens of deciduoma malignum, and several good cases of multiple fibro-myomata of the uterus, of various sizes. A portion of a fibro-myomatous tumour of the uterus, the weight of which, after removal, was fifty-three pounds, was exhibited with photographs of the patient and the tumour; the structure of this tumour consisted of soft fibrous tissue and unstriped muscular tissue, the whole undergoing cystic degeneration. Other cases of interest in this section were a hydatiform mole and specimens of advanced tuberculous disease in the epididymis and testis, the latter disease being an exceptionally common one in Egypt.

There is also a splendid collection of multitudes of different varieties of *internal parasites of man and the higher animals* prepared by Professor Looss. This gentleman is Professor of Helminthology at the

University of Leipzig, but has been attached to the School of Medicine in Cairo for some five years, in order to carry out research work in connection with Egyptian parasites. The collection is most interesting, not only from a purely helminthological point of view but also from a clinical standpoint. Many new parasites discovered by Professor Looss while working in Egypt were exhibited with good typical specimens of all the more generally known species, including filaria, ankylostoma, and others. These specimens are all beautifully displayed and mounted.

We cannot conclude without expressing our admiration at the pitch of excellence to which the glyceroformol method has attained in the hands of Dr. Symmers, the Professor of Pathology to the School. The specimens are all beautifully mounted, and could not be improved upon for the use of students and for demonstrative purposes.

RECENT EXPERIENCES OF THE UNITED STATES ARMY WITH REGARD TO SANITATION OF YELLOW FEVER IN THE TROPICS.

By Major W. C. Gorgas, Medical Corps U.S. Army.

Paper read before the Egyptian Medical Congress.

This being the section devoted to tropical diseases, I have thought that some account of the original investigations made concerning one of these diseases, and of the sanitary work carried out as the result of these investigations in the tropical island of Cuba by the United States Army, might be of interest to the section.

While our sanitary work in Cuba was on general lines, the particular interest in this work and our efforts were centred upon yellow fever; and for very obvious reasons. Yellow fever is the only one of the severe epidemic diseases to which the Western continent has been subject to any extent. While cholera has spread in most parts of this continent, its ravages have not been at all comparable to those of yellow fever, and the plague has never affected the Western continent to any extent. Yellow fever, on the other hand, has ravaged both continents many times; on the eastern shore, from Quebec on the north to Montevideo on the south, and for long distances on the western shore; and within these limits the destruction of life caused by its prevalence has been second only to the great losses caused by cholera and plague in the large European centres; sometimes, in as large a city as Philadelphia, killing one-third of the population present at the time of its prevalence. It has been particularly fatal where large numbers of non-immunes have been brought together within the Tropics, and this has made it the dread of military commanders in these regions. In this respect it has been more certainly fatal than cholera or the plague in the East. Military expeditions in the Tropics in the past have been almost certain to suffer from this disease, and there have been several instances of large bodies of men being almost entirely swept off, and the objects of the expedition frustrated, by this disease alone; as the French expedition in 1802 to Haiti, in which, out of 25,000 men, nearly 22,000 died of yellow fever in one season, leaving the remainder entirely at the mercy of the enemy, who scarcely had to fire a shot.

To the United States for the last generation yellow fever has been particularly important, not only on account of the loss it has caused to the population, but on account of the great financial loss caused by the quarantines, which were established all over the country when this disease appeared in epidemic form; and of late years along our southern coast these quarantines are established every summer to prevent the introduction of the disease from the neighbouring coast of the Gulf of Mexico. It is estimated, for instance, that the financial loss caused to the Mississippi valley by the last great epidemic of 1878 amounted to not less than 100,000,000 dollars.

The origin of this disease, as that of all others, is shrouded in obscurity. We have pretty good evidence that it existed among the Indians on the Mexican coast before the landing of Cortez, and since that time it has been continually present in the West Indies and the coast bordering the Gulf of Mexico and the Carribean Sea. Occasionally it spreads from this, its constant home, and about the beginning of the nineteenth century it looked as if it might become one of the great epidemic diseases of the world. It made its ravages at that time in Spain, France and Italy, and all along the eastern inhabited coast of North and South America. It has never been known in the densely-populated countries of China and India, or any part of Asia or Australia.

I will not go into the symptomatology more than to say that yellow fever is a febrile disease of about a week's duration, with well-marked and characteristic symptoms in the pronounced cases, and, as in other febrile diseases, shading off into every variety of mildness in character. A great deal of study has been given to yellow fever, and the peculiarities as to its mode of spread, its history and symptomatology, are very well known. At the time of the outbreak of the Spanish-American war, the following facts with regard to the disease had been pretty well settled and generally received: That it was endemic about the Gulf of Mexico as stated above; that outside of its endemic focus it was not found unless imported there in some way; that a temperature below the freezing point almost always caused its disappearance; that it could not be communicated directly from person to person. It was universally received that it was transmitted to fomites, and it was well known that a sick person or fomites introduced into a non-infected house would not at once infect it, but that a considerable length of time had to intervene between the introduction and the infection. That, for instance, a man sick of yellow fever, if introduced into an unaffected house, could be nursed with entire safety by a non-immune, but that in the course of time this house would become dangerous, from the fact of the yellow fever patient having been there, and that after this time a non-immune was liable to contract yellow fever from merely entering the house. It was known that heat and moisture were very favourable for its development; that it did not occur above certain altitudes; that non-immunes could escape the disease entirely by leaving an infected town, and that they did not, as a general thing, carry the disease with them.

At the outbreak of the Spanish-American war Havana was generally believed to be the principal endemic focus in the Western continent. The disease was known to never have been absent from this city for the past 150 years. And it was the point from which all the surrounding countries were being constantly reinfected. The States of the Union lying along the Gulf of Mexico were in particular danger from this source, and the yellow fever of Havana was looked upon as costing these States the loss of many millions of dollars yearly. From the experience of Spain and other European nations in sending large bodies of troops to the West Indies, and from the experience of the English in India and their East Indian Possessions, the United States military authorities looked with anxiety upon our expeditions into Cuba, and feared a very large mortality from disease, and particularly from yellow fever. We had long been accustomed to protect our small garrisons from yellow fever when epidemic in the southern States by moving the garrison a few miles from the infected locality. This was almost invariably successful, and in a few cases in which the first move was not successful a second would be, if care were taken to remove those who sickened in the first few days. But an army undergoing active military operations is not always able to do this, and we know that, on account of the large body of Spanish soldiers present, nearly every part of the island was infected by yellow fever.

In taking possession of Havana, our principal sanitary object was to get rid of yellow fever. We believed that the cities on the eastern coast of the United States, such as Boston, New York, and Philadelphia had ceased to be subject to yellow fever, on account of their improved sanitary condition. We therefore hoped that we would get rid of yellow fever, or at least greatly decrease it, by placing Havana in good sanitary condition; hence we promptly set about this work. Liberal appropriations of money were made for the purpose, and every measure that sanitary science of that day could suggest was adopted. Of course I refer to more or less temporary measures. We knew that we would not have time for an extensive system of sewering, or any such permanent improvements. So far as the general mortality of the city population was concerned the results obtained by these methods were very gratifying. The death-rate, which in 1898—the last year of the war and of Spanish occupation—was 91·03, fell in 1899 to 33·67, in 1900 to 24·40, and in 1901 to 22·11, a rate which compares favourably with the rates of the more civilised cities of Europe and America; but, to our chagrin and disappointment, we apparently had no effect upon yellow fever.

We had gone to Cuba with the idea that yellow fever was a filthy disease; that its germ developed in decomposing organic matter. We had hoped that if we thoroughly cleaned up Havana we would deprive the city of the culture medium in which the yellow fever developed, and thus rid it of the disease itself; but we found that, while we had little or no yellow fever in the early part of 1899, it began to increase very rapidly after August of that year, when a large non-immune Spanish immigration began to pour in, and December of 1889 was one of the worst Decembers for this disease ever recorded in Havana. During 1900 the sanitary conditions of the city, as evidenced by the general death-rate, continued to improve. Yellow fever, on the contrary, grew worse and worse, and 1900 was one of the severest epidemic seasons, even for Havana, which had been recorded for the preceding 140 years. The best and most cleanly parts of the city were most affected. The Sanitary Department had now had two years of most careful cleaning, disinfection and isolation of yellow fever, without having any perceptible effect, and I became convinced that the disease could not be eradicated on these lines alone.

Early in 1900 a Board of Army Medical Officers, of which Major Walter Reed was president, was sent to Havana for the purpose of studying yellow fever. After working on various lines they determined to study the mosquito with reference to the disease. They were led to this determination for several reasons, as stated in their "Preliminary Note," more particularly by the well-known epidemiological course of the disease, by the work of Ross, on the transmission of malarial fever by the mosquito, and by the report of U. C. Carter, Marine Hospital Service, U.S.A., on the interval between the infecting and secondary cases of yellow fever. They established an experimental station in the country and half-a-mile or more from any habitation, placed non-immunes in this camp under military control, so that they could not leave it, kept them there a sufficient length of time to be certain that they had not contracted yellow fever, and then experimented upon them with the species of mosquito which, Dr. Finlay maintained, propagated yellow fever. Dr. Carlos Finlay is an eminent physician of Havana, who has been writing and maintaining ever since 1881 that a certain species of mosquito in Havana was the means of transmitting the disease from person to person. Dr. Finlay had made many experiments with the mosquito, but the results obtained by him were such that they were not anywhere accepted as proving his contention.

The Army Board, after considerable experimentation, found that they could take a Stegomyia, let it bite a yellow fever patient within the first three days of the disease, keep the mosquito from twelve to twenty days, let it bite a non-immune, and almost invariably transmit the disease. They had some eighteen cases transmitted in this way. The fact that the disease so transmitted was yellow fever was established not only by well-marked symptoms, but by having well-known physicians of Havana see the cases, and also having them diagnosed by the official board of Havana, which diagnosed all cases occurring in that city. The following year the Sanitary Department, in an endeavour to immunise, had patients bitten by infected mosquitoes. An autopsy held in a fatal case occurring in these experiments confirmed the diagnosis in every respect. But the symptoms of yellow fever are so pronounced in a case at all severe that there is ordinarily but little doubt about it.

As above described, the Board had taken the precaution to isolate the men experimented upon, so that they could contract the disease in no other way. At the same time that these experiments were going on the Board had a mosquito-proof house built, in which they placed fomites of all kinds—clothing, bedding, and all

things soiled by yellow fever patients. In this building non-immunes slept for two weeks, were then taken out, kept for two weeks longer in the camp, bitten by the mosquito, and promptly developed yellow fever. The period of incubation was found to be from three to six days, the shortest time being two days and twenty-two hours, and the longest six days and two hours. The Board also found that the disease could be transmitted by injection of the blood of patients suffering from yellow fever taken within the first three days of the disease.

The incubation period in one of these blood cases was slightly under forty-eight hours. They also found that the blood, after being passed through a filter which would stop all known micro-organisms, still retained the quality of transmitting the disease, tending to prove that the micro-organism which causes the disease is still sub-microscopic.

These investigations of the Board of Army Medical officers convinced the Sanitary Department that the Stegomyia mosquito was the only way of propagating yellow fever, and that fomites played no part whatever in its transmission. Granting these conclusions as facts, it was evident that if we could get rid of the infected Stegomyia and prevent any more Stegomyia from becoming infected, we would get rid of yellow fever. With these objects in view a scheme was worked out :—

First, to prevent mosquitoes biting people who had contracted yellow fever. For this purpose arrangements were made so that the quarters of a patient were screened with wire netting, within two hours after the case was reported, and a guard placed over the quarters to see that the one wire door allowed was kept properly closed. Immunes were freely allowed to pass, and no notice was taken of fomites of any kind

Secondly, to kill all mosquitoes that might have become infected before the screening of the patient. For this purpose arrangements were made to kill all mosquitoes, both in the house occupied by the patient and in all the contiguous houses. Each room was carefully closed and sealed, just as if formaline was going to be used, and pyrethrum burnt in the room, at the rate of a pound to 1,000 cubic feet of space. Pyrethrum powder, while not the best insecticide, was found to do less injury than other substances, but care was taken to sweep mosquitoes up after its use and destroy them, as a considerable portion of them would revive when exposed to the fresh air.

Thirdly, arrangements were made to keep out people suffering from yellow fever, either in its active or incubative stage. On the sea-side this was managed by a five-day quarantine maintained by the Marine Hospital Service. On the land side we had a system of inspection by which all non-immunes were reported, registered, and seen daily by a physician for six days. During the latter six months of 1900 Havana admitted from the infected towns around her, on the land side, some 1,200 non-immunes. From these 1,200 non-immunes we picked up some twenty odd cases of yellow fever. Business and travel did not appear to be interfered with in the least, and no attention whatever was given to traffic or the introduction of fomites of any kind. The system was entirely satisfactory, and I believe could be adopted to advantage in all similar cases.

Fourthly, brigades were organised for the destruction of mosquito larvæ in all parts of the city and suburbs. This was the part of the work on which we put the most labour, and that cost us most.

We modified our original system considerably, as we learned the habits of the different species of mosquitoes, and found the ways whereby our labour could be most advantageously expended. We were very successful in decreasing the numbers of mosquitoes. By the end of 1901 they were much less numerous in all parts of the city, and in many parts had entirely disappeared. In January, 1901, just before the mosquito brigades were organised, an inspection was made of the whole city, and it was found that mosquito larvæ existed in 26,000 different deposits in the city. The inspection made in January, 1902, when the mosquito brigades had been at work about ten months, showed less than 300 deposits of larvæ in the same area. The effect of the mosquito destruction can be well measured by the death-rate from malaria. In 1900 this was 344; in 1901, 151; and up to July, 1902, 47.

The results as to yellow fever were complete. From the institution of these measures yellow fever began rapidly to decline. Each focus was entirely destroyed as it appeared, and gave no more trouble. The work was commenced in February, 1901, and on September 28th of the same year the last case of yellow fever, occurred in Havana. Since that time—now more than a year—not a single case has originated in the city. As evidence that this is not accidental, I here insert a table of the deaths from yellow fever for the last twelve years :—

Deaths from Yellow Fever according to Yellow Fever Year.

Years	1890-1891	1891-1892	1892-1893	1893-1894	1894-1895	1895-1896	1896-1897	1897-1898	1898-1899	1899-1900	1900-1901	Average	1901-1902	1902
Months														
April	13	5	8	8	4	6	14	71	1	2	0	12·00	0	0
May	23	7	7	23	16	10	27	88	4	0	2	18·81	0	0
June	38	41	13	69	31	16	46	174	3	1	8	40·00	0	0
July	67	66	27	118	77	88	116	168	16	2	30	70·45	1	0
Aug.	60	66	67	100	73	120	262	102	16	13	49	84·36	2	0
Sept.	33	65	70	68	76	135	166	56	34	18	52	70·27	2	0
Oct.	32	48	54	46	40	102	240	42	26	25	74	66·27	0	0
Nov.	15	24	52	28	23	35	244	26	13	18	54	48·36	0	0
Dec.	9	17	33	11	29	20	147	8	13	22	20	29·90	0	0
Jan.	10	15	15	7	15	10	69	7	1	8	7	14·90	0	
Feb.	3	10	6	4	4	7	24	1	0	9	5	6·63	0	
Mar.	4	1	4	2	2	3	30	2	1	4	1	4·90	0	
Total	307	365	356	484	390	552	1385	745	128	122	302	466·90	5	0

A glance at this table will show that yellow fever has probably never been absent from Havana for a single day in all these years; that the smallest number of deaths occurring from this disease was 122, in the year 1899; the largest number, 1,385, in the year 1896; average, 466; and, as far as we can find from the records, the same condition of affairs has existed since 1762.

The same favourable condition of affairs was witnessed in the Army. The first year of our occupation, in 1898, with an average strength of 8,345, we had a death-rate from disease of 67·94; in 1899, with an average

strength of 11,969, we had a death-rate from disease of 17·29; in 1900, with an average strength of 8,690, we had a death-rate from disease of 8·40; in 1901, with an average strength of 5,297, we had a death-rate from disease of 3·21; and in the fiscal year ending June 30th, 1902, with an average strength of 4,187, we had a death-rate from disease of 1·43. The death-rate for 1902 was smaller than our death-rate from disease, either in the United states or any possessions of the United States.

A consideration of these facts will, I think, convince an unprejudiced reader that our great success in the preservation of the health both of our troops and the native population, in the entire extirpation of yellow fever, and the almost entire extirpation of malarial fever, was due to the destruction of and precautions against the mosquito, and that these measures would never have been instituted except for the discoveries made by the Army Medical Board.

Current Literature.

Campaign against Mosquitoes in Sierra Leone.—Second Progress Report, by M. Logan Taylor, M.B., of the Liverpool School of Tropical Medicine.

In his valuable report Dr. Logan Taylor states: "Very careful drainage is necessary to get rid of Anopheles larvæ, as the smallest collection of water left will harbour them. Besides the street work, pools in private yards must also be dealt with, either by draining them into the street culverts or by other means. In Cape Coast also all the existing drains which are in bad repair are being properly cemented, and new drains are to be made in some of the bad streets. As it will be some years yet before many of the streets in Freetown can be dealt with, a gang of sixteen men is employed doing nothing else than looking after Anopheles breeding grounds in untouched streets. For that purpose I divided the town into eight divisions, with two men to each division. This allows them to get round every drain and pool at least twice a week. Where the pools are small the water is simply swept out, but larger ones are treated with some culicicide—either

Crude Kerosene or Crude Creosote Oil.

By this means the larvæ are killed off when quite small. One often finds also that adult mosquitoes get entangled in the film of oil on the surface of the water when they come to lay their eggs. I have tried other culicicides besides these two mentioned before, such as formalin, corrosive sublimate, copper sulphate, carbolacene, &c., but found them to be inferior to the others, and they are more expensive and not so easily applied. A little oil is simply poured on a pool and the water well stirred up so that a film of oil spreads over the whole surface, and natives very quickly learn how to do this. Crude kerosene thus applied will last a week if no more rain comes. Crude creosote oil kills larvæ much more quickly than does the crude kerosene. If half a drachm of it be added to a pint of water in which there are adult larvæ and the water stirred up the larvæ will all die within five minutes; pupæ are more resistant and will live for an hour or more, especially if they are on the point of hatching, and then they are very difficult to kill, the adult insects often appearing, but they do not get a chance to fly away, being caught in the film on the surface the moment they are free. One peculiarity of the creosote is that being rather viscid when stirred up in the water many larvæ get caught in the globules and cannot get free. Under the same conditions, but using crude kerosene instead of the creosote, the larvæ will live as long as fifteen to twenty minutes. The female *Anopheles costalis* lays her eggs in from one to three days after a feed of blood, and in two to three days after that the larvæ are hatched out, then, according to the temperature and the feeding, the adult insects appear in from nine to fourteen days, the pupa stage lasting about two days before the adults appear."

PLAGUE.

India.—During the weeks ending December 6th, 13th, 20th, and 27th, the total number of deaths in India from plague amounted to 12,400, 13,415, 14,203 and 15,897 respectively.

Cape Colony.—A case of plague was notified at Port Elizabeth during the week ending December 13th, a second case during the week ending December 27th, and a third case during the week ending January 3rd, 1903.

Natal.—At Durban a serious outbreak of plague has occurred, some 50 cases of the disease having been reported.

Mauritius.—During the week ending January 22nd 8 cases of plague occurred in Mauritius and 4 deaths from the disease.

Mexico.—At the city of Mazatlan a serious outbreak of plague is reported. The disease is stated to have been introduced by Chinese coolies.

CHOLERA.

Egypt.—On January 22nd no fresh cases had been recorded for three days in any part of Egypt.

Malta.—A British ship arrived at Malta, from Alexandria, on January 14th, with 9 cases of cholera on board.

Asia Minor.—Cases of cholera are stated to occur daily at Damascus.

Persia.—At Bender-Abbas, on the Persian Gulf, a case of cholera was reported on January 3rd.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—FEBRUARY 16TH, 1903.

Original Communications.

NOTES ON CASE OF OMUNONO (YAWS).

By Dr. A. YALE MASSEY,
American Mission, Benguella, West Africa.

With Plate.

PATIENT, male, aged 30, came here November 5th, 1900, fairly well nourished. Very careful in walking, as the sores in his crutch were irritated by the friction.

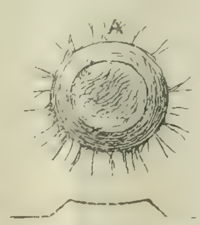
About nine months ago sores appeared on his privates, a month later on his face, a month later on his feet and legs, and sometime after on his hands. Some scars were evident where the sores had healed, leaving a ring of lighter skin with a hyper-pigmented margin.

Examination revealed sores on : Penis : terminal $\frac{1}{3}$, could not retract the prepuce, nor see the glans; patient said there were no sores on the glans. Scrotum: anterior part covered with sores. Nates: along the margin of the anal fissure, especially over the ischium. Legs: along anterior inner margin of the thigh, large confluent sores. Backs of both legs to the popliteal space. Foot: outer margin of soles, one each. Many between and on under surface of toes. Face: forehead, nose, corners of mouth, chin, ears, and one above and behind the left ear. Many in the edge of the hair on the forehead. Those on face were smaller than those on the leg. Chest: upper part, a few. Arms: a few on humeral region. One on posterior border of axilla. None in axilla. Nose: on the mucous membrane inside the nose. Mouth: a couple of patches on the hard palate, hyper-pigmented margin and light centre; none on back or abdomen. Hands and wrist: many, and on fingers.

The Sores.—Just below the clavicle appeared to be some commencing sores, small, pin-head to split-pea. Those on face were $\frac{3}{8}$ to $\frac{3}{4}$ in. in diameter, tending to be confluent; about same size on scrotum. On thighs large, 2 in. in diameter, from the coalescing of several. Same on legs. On toes, irregular and under thick callous covering.

The typical sore (see diagram) presented an outer ring (A), at about an angle of 45° with the surrounding skin somewhat depressed in the centre. Beyond is the healthy skin, which is wrinkled, with lines radiating from the ring. Here are free margins of skin, which bleed on being pulled. Colour of scab light dirty yellow, and the ring ~~has a~~ callous look, while the disc has a closely woven-net appearance. The disc is about as stiff as good note paper.

The crust is adherent at the margin only, and is removed easily by lifting with the finger-nail. A little oozing may be noticed at the margin. Underneath is a yellow cheesy layer over a granular-looking base. The base is hemispherical. When the cheesy covering is removed a pale red base is shown, which is insensible to the touch, and a drop of nitric acid is felt only after about thirty seconds. The base is tough and cushion-like. After removing the crust the sore dries somewhat and another crust is gradually formed



APPEARANCE OF SORE WITH SCAB THREE OR FOUR DAYS OLD. (below) Outline of Section of Sore.

A scab one day old becomes firmly adherent at the base and cannot be removed without much difficulty, and when removed, the base exudes a straw-coloured fluid, which is thin enough to run down the skin. However, a new scab is soon formed. The sores on the feet and hands were flatter, and scarcely raised at all. In the older crusts the matter can be pressed out under the scab.

Patient said: "At the beginning of the disease there was much fever and pains through the whole body. The young sores were very itchy. The ulcers

do not seem to affect the hair follicles, as the hairs are firm, and in no case have I noticed them to fall out, or to become loose. Natural pain on pulling them.

Treatment.—Cod-liver oil internally, 2 drachms daily. Sores: scabs removed and washed daily with carbolic sol. 1 in 100, and the sores touched with sulphate of copper and left bare. Tried one leg, after washing, with applications of bichlor. gauze, 1 in 1000, but scabs reformed with pus under them. Saw no improvement after a week, while the sores touched with sulphate of copper showed marked improvement, scarcely any pus forming underneath, and scabs becoming adherent. Those on scrotum and penis seemed to heal first. Some that were not touched by sulphate of copper showed marked improvement, for instance, those in the nose and mouth, which healed without being touched. The large sores seemed to heal from centre. Inside a week patient was much brighter and much encouraged. In four weeks—last two weeks every second day, washing was done—the sores showed only some dry scales. Many entirely healed, leaving a very dark pigmented skin.

October 22nd, 1902, two years later, patient appeared, looking fat and well, but showed me one large ($\frac{3}{4} \times \frac{1}{2}$ in.) characteristic sore on the scrotum. The scars of the old sores were scarcely noticeable, only showing some hyper-pigmentation.

BERI-BERI IN QUEENSLAND.

By Edward B. Ormerod, M.R.C.S., L.S.A.

The following communication was addressed to Dr. Manson, C.M.G., F.R.S.

Reading the account of the discussion on beri-beri at the last annual meeting reminds me of several cases, about a dozen in all, which I saw while in charge of the hospital at Boulia, in the far west of Queensland, during 1898-99 and 1900. As I have left the notes of the cases in the hospital books out there I can only now speak of the cases from memory. Most of them had swelling of the legs and abdomen, two very considerably, and also of the rest of the body. The two mentioned died suddenly, but I think all of the others got well up to a certain extent, some sufficiently to go back to work, but weakness and some numbness of the legs remained. The knee-jerks were absent in most of them. I do not think that any had albumen in the urine, as I tested the urine in all of them.

The few cases with least swelling, more of the "dry" variety, seemed to suffer most from symptoms of peripheral neuritis and took the longest to get well. I treated them with every thing in the pharmacopœia that I had read of in Dr. F. Manson's account of the disease and that was likely to do them good, and strychnine and iron seemed of the most good, and afterwards the battery. I heard there that symptoms like these had been known for years about that part, and were put down by the bushmen to bad living and bad water, and called scurvy.

I had, unfortunately, no means of examining the blood. The condition of the country, food, and habits of these men may assist someone to suggest a possible predisposing cause for the disease.

In the first place the town of Boulia is the centre of that large district which was then, and still is, smitten with the greatest drought ever known in Queensland. The town is 240 miles due west from the nearest railway, and 800 or so miles from the coast, 40 miles within the Tropic of Capricorn in about latitude 23 S. and longitude 139 E. It is on a fair-sized river, the Burke, but during these years it dries up for most of the year to a chain of water-holes, and then from the distance one hole is from another, and the cattle having to go many miles for grass after eating up what there is near the water-holes, come in every two or three days, and after gorging themselves are in such a weak state that thousands of them get "bogged" and die there. It is quite impossible to drag so many out and they rot and contaminate the water until another flood comes and washes them down. I saw one water-hole with 2,500 dead cattle and sheep bogged in or near it. That is one water supply which bushmen depend upon, and more than any other, as the holes are known, and when travelling they make for them to camp at. The other chief water supply, and now largely increasing, is the artesian bores out in West Queensland. Some of these are not very deep, 200 feet or so, but they are now getting scattered about the country and are largely depended upon in the dry season for a camping-ground. The water from most of them has a sweetish metallic taste and contains an excess of magnesia; they generally purge people freely at first and sometimes cause slight urethritis, as the water that ships take in for consumption at the ports of Java does. At the stations (cattle homesteads) and in the bush towns the chief supply of drinking water is rain conserved in galvanised iron tanks. I have not met with any cases of peripheral neuritis or beri-beri in people here who only drink rainwater from these tanks, although I never met so many children and adults with decayed teeth as there are in this State, perhaps from want of lime in the water.

Food.

For the ordinary bushman this consists of beef—more often salted than fresh—damper (flour and water kneaded up and baked in the ashes), and sometimes jam, sauce and pickles, and tea with every meal and between them. Vegetables are unknown to the ordinary travelling bushman, unless when he passes through a town, or perhaps when employed at the head station of a run. They generally live and sleep in the open air, or at most in an open hut or tent.

Whirlwinds.

Another possible mode of dissemination of infection is by the ever-recurring whirlwinds, especially towards the end of the year, October, November and December, which was the time that most of my cases came in for treatment.

From the ground, especially in the roads which are not made but only bush tracks, and along the river banks, where the cattle have cut it up when coming in to water, these whirlwinds take up in the dust in clouds, perhaps a hundred yards wide and apparently

a mile high, and you can see them travelling down on the wind, gathering strength as they go, and as they pass over a soft and cut-up place, and through a town, will take up anything movable and not too heavy, such as loose roofing iron, making a tremendous disturbance in a back yard, if it happens to strike one, amongst the kerosene tins, empty meat and jam tins, &c., so that if there is any infection in the soil it can easily be passed on by different whirlwinds for hundreds of miles. And this I should think might account for the great prevalence of typhoid fever in the west of Queensland, where it is always more or less endemic, and breaks out with great virulence during extension of railways, and generally after that for perhaps a hundred miles round the terminus, where generally a large town soon springs up from almost nothing but a camping place for carriers to a population of thousands within a year or two.

To go back to my beri-beri patients, I remember two who were living on a station where a new bore was being sunk. The first patient was in charge of the work, but did not at first, I think, drink the water, although probably he was constantly wet with the first supplies. He was in the hospital for about six weeks and went back to work almost well, except for some weakness and numbness in his legs. He had been a hard drinker previously, but not of late years. He had a good deal of swelling of the legs and abdomen. The other patient was the manager of the same station, who wrote me after I had left there for treatment, and as they had had very little rain he was probably living altogether on bore water; he went back after a three months' trip to the coast fairly well, I believe.

MALARIA AND MALIGNANT DISEASES IN HOT CLIMATES.

By James Cantlie, M.B., F.R.C.S.

Being information collated from "Selections from Colonial Medical Reports for 1898 and 1899," published by the Colonial Office.

As the question of malarial infection proving antagonistic to the development of malignant disease has been several times brought forward of late, I have collated from the Colonial Office Reports what information is therein contained concerning these two diseases, and now present it in a tabulated form.

The reports deal almost exclusively with hospital statistics, and therefore do not actually represent the whole of either the malarial or malignant disease occurring in any one colony; but as the malarial cases and the malignant diseases are estimated on the same basis, namely, hospital reports, the proportion of the diseases to each other is not thereby affected.

It is seen that with the exception of Basutoland the first six colonies named occupy the same position in both tables; and that Selangor, the most severely malarial district, is but three from the end of the list in the malignant diseases frequency table.

The tables only show that malignant disease and malaria may co-exist in the same communities, but we have no means of ascertaining whether the persons attacked by malignant disease were suffering from, or had ever suffered from, malaria.

The question of malignant disease amongst native races remains a vexed one; and although these tables do not show whether we are dealing with Europeans or natives, it is a fact that over 90 per cent. of the hospital inmates are natives. In a hospital in the West Indies, British Guiana, for instance, natives

Colonies numbered according to proportion of malarial infection amongst the residents	Population (approximate)	Malaria: Actual number of cases of malaria	Malaria: Proportion of cases of malaria to population	Malignant Diseases: Actual number of cases of malignant disease	Malignant Diseases: Proportion of cases of malignant disease to population	Colonies numbered according to proportion of malignant disease amongst the residents
1. Bermuda	16,300	0	0	0	0	1
1. Seychelles	19,550	0	0	0	0	1
3. Basutoland	270,000	1	1—270.000	32	1—8,437	11
4. Fiji	122,700	22	1—5,577	0	0	1
5. Sierra Leone	74,850	102	1—733	0	0	1
6. British Honduras ...	37,500	54	1—694	0	0	1
7. St. Kitto, Nevis, and Anguilla	33,100	67	1—494	11	1—3,009	14
8. Hong Kong	259,300	850	1—305	24	1—10,804	10
9. St. Lucia	48,650	381	1—127	20	1—2,432	15
10. Trinidad and Tobago ...	260,500	1,293	1—124	23	1—11,326	9
11. British Guiana	287,300	2,351	1—122	67	1—4,288	16
12. Negri Sembilan... ...	83,600	849	1—98	2	1—41,800	7
13. Mauritius	379,600	4,152	1—91	46	1—8,255	12
14. Perak	294,300	4,751	1—61	20	1—14,715	8
15. Pahang	57,550	1,591	1—37	1	1—57,550	6
16. Selangor	81,600	2,320	1—35	12	1—6,800	13

form the principal number of occupants, whilst in, say, the Government Hospital of Hong Kong, Europeans form a large proportion of the patients. We require more exact statements as to the nationality of the population, and the numbers of each nationality in our Colonial Hospitals, before a conclusion can be arrived at.

Whilst lamenting the want of complete uniformity in colonial medical reports, we are glad to note that the Colonial Office authorities have made a decided advance, by insisting that a uniform list of diseases, to be filled in by the medical officers in the various colonies, is insisted upon.

THE STUDY OF TROPICAL MEDICINE IN THE UNITED STATES.—Dr. Robert S. Linn and Dr. V. J. Hooper have been appointed Lecturers on Tropical Medicine in the Michigan College of Medicine and Surgery. Since Cuba and the Philippines have come under the sway of the United States it is essential that medical practitioners, intending to proceed to either of these countries, should receive preliminary instruction in the diseases they are likely to meet with.

A HOSPITAL FOR CHINESE has been opened in New York. Patients will be treated by Chinese "doctors" according to the *regime* followed in China. From what we know of such practice we pity the inmates suffering from surgical ailments.

THE INVESTIGATION OF SLEEPING SICKNESS IN UGANDA. — Lieutenant-Colonel Bruce, R.A.M.C., F.R.S., and D. N. Nabarro, M.D., of the Pathological Laboratory, University College, London, are to proceed to Uganda immediately to investigate and report upon the nature, the mode of spread and the means of preventing sleeping sickness, which is devastating that country. It will be remembered that in July, 1902, a Commission consisting of three members was sent to Uganda for a similar purpose. As the researches then made were not considered conclusive, the Royal Society, in view of the serious nature of the malady, has resolved to supplement the previous inquiry. It is unofficially reported that Dr. Castellani, one of the members of the former Commission, ascribes the ailment to a parasite which he discovered, and thereby annuls the possibility of the *Filaria perstans* being the cause of the disease. We shall follow the researches of the new Commission with interest.

KAISER-I-HIND MEDAL. — Major D. Semple, R.A.M.C., and Colonel W. S. Lyons, I.M.S., have been awarded the Kaiser-I-Hind gold medal, the former for his administration of the bacteriological laboratories in India, and the latter for plague duty.

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THE

Journal of Tropical Medicine

FEBRUARY 16, 1903.

THE SECTION OF TROPICAL DISEASES AT SWANSEA.

WE are glad to know that the Council of the British Medical Association are about to reconsider the question of holding a Section devoted to Tropical Diseases at the forthcoming meeting of the British Medical Association at Swansea. We believe that a wise policy will prevail, and in our next issue we hope to be able to announce that the meeting is to be held.

THE MISSION TO SOUTH AFRICA TO INVESTIGATE RED WATER IN CATTLE.

IT is announced in some of the daily papers that Professor Koch, accompanied by Drs. Nieufeld and Klein, has proceeded to South Africa to inquire into the epidemics which are causing so much havoc among the cattle of Rhodesia and to advise remedial measures. We understand that the disease which is likely to attract most of the attention of the Commission is red water in

GOUNDOU.

Illustrating Article by Dr. FRIEDRICHSEN.

Bale and Danielsson, Ltd., London.

cattle, which we learn has of late been assuming alarming proportions. We wish the Commission every success and there can be little doubt that with Professor Koch as its eminent chief the investigation will be fruitful in results.

But while we express confidence in the work which will be done by the Commission, we must confess to much disappointment that once more South Africa has turned to Germany for enlightenment on a subject which affects British interests in British territory. Is it a fact that there are none in the scientific world of Great Britain capable of carrying out such investigations? If so scientific training must be at a low ebb in this country, and it seems as if that were the conclusion the authorities in South Africa have come to, when they decided to ask Professor Koch to assist them in checking this epidemic which threatens to destroy their cattle. It may, however, be on other grounds that the selection was made. Perhaps it was due to the success which attended Professor Koch's previous visit, when the Transvaal and other parts of South Africa were not over friendly towards Britishers, and preferred German scientists, and that now a change has come over the condition of South Africa the benefits derived from Professor Koch's visit are not forgotten. The bile treatment of rinderpest introduced then by Professor Koch was assuredly an advance on all previous preventive methods and as such deserves grateful recognition, but we regret to see that the system which replaced it, viz., the blood and serum prophylactic introduced by Dr. Turner, has not received that recognition which it deserves, even from Professor Koch.

It is to be hoped that the latter supposition and not the former, is the true explanation. Whatever the explanation may be, the fact comes to us as a surprise, for we understood that Colonel Bruce, R.A.M.C., was to proceed to South Africa on the same mission. His work on Malta fever and Nagana marked him as a suitable scientist for such an important investigation, and it is with regret we find in his stead that Professor Koch and two German colleagues have been selected by the South African authorities.

It is not as if the importance of investigations such as these have not been fully appreciated and advocated by those interested in British possessions. We have only to refer our readers to a letter written by Professor W. J. Simpson, dated Cape Town, June 25th, 1901, *i.e.*, more than eighteen months ago, and circulated at the Cape.

The letter proceeds to state that "many large tracts of country in South Africa could be profitably occupied by Europeans were it not for the ravages of malaria and other semi-tropical diseases. If sufficient funds were forthcoming for scientific investigations into these diseases they could be brought under control and be no longer a deterrent to occupation. This refers not only to large portions of the Transvaal, but also to Rhodesia and the territories north thereof, through which railway construction is about to take place, and it is a self-evident fact, if malaria could be dealt with in a practical manner, one of the great difficulties in taking the railway from the Cape to Cairo would be overcome and its success assured. Further, it is evident that for the development of the country and its successful occupation, the diseases which are now so destructive to horses and domestic animals should be scientifically investigated. It is necessary that every effort should be made to secure the safety, reproduction and maintenance of domestic animals; for a country without these, or in which they have a difficulty to live on account of disease, loses much of its value for occupation by a civilised and agricultural people."

Professor Simpson concludes his letter with the following important statement: "A few months ago when in Pretoria, I found that in one week there was a loss of no less than £2,400 from horses dying of horse-sickness, and I understand it was not an exceptional year; and in looking over the Rhodesian accounts I noticed that £12,000 has to be annually voted to horse 600 police, and the cause of this is that none of the horses live on an average more than one year, due probably to malaria, horse-sickness, and other allied diseases."

Britain has to acquire all its funds for scientific work by begging, and is therefore dependent on

public generosity — not that the begging often comes to much; and so it happens that, when any investigation has to be made, her own sons are passed over, and the assistance needed is obtained from scientists nurtured in a country where science is encouraged and directly supported by the Government.

British Medical Association.

TROPICAL OR AMŒBIC ABSCESS OF THE LIVER AND ITS RELATIONSHIP TO AMŒBIC DYSENTERY.

By Leonard Rogers, M.D., M.R.C.P., F.R.C.S., B.S., I.M.S.,
Officiating Professor of Pathology, Medical College, Calcutta.

In spite of recent advances, it may be safely said that the pathology of tropical abscess of the liver is still in a very confused state. This is well illustrated in the two articles in Clifford Allbutt's "System of Medicine," the first entitled "Suppurative Hepatitis" by Davidson, and the second on "Amœbic Abscess of the Liver," by Lafleur. The former writer regards the disease as one produced by ordinary pyogenic organisms acting on a liver predisposed to inflammatory changes by life in the Tropics, while the latter holds that about half the cases of the disease are associated with amœbæ, which act either as direct excitants of pus formation, or only as carriers of pyogenic organisms. Still more divergent are the different views held as to the relationship of liver abscess to dysentery, Manson quoting various writers as having found from 3 to 98 per cent. so connected, this wide divergence no doubt being due to different forms of dysentery being met with in various places; the amœbic form, which is now pretty generally considered to be that which is most intimately connected with liver abscess, constituting a very different proportion of the total cases of dysentery met with in various countries. The intrusion of the amœba into this field has necessarily upset old ideas as to the pathology of liver abscess, while the number of observations yet recorded has not been sufficient to establish the exact limitations of the played *rôle* by the new factor, Kartulis's paper, for example, being based on 13 cases, and that of Kruse and Pasquale on 15, in 6 of which only was the amœba found, the others being classed as "idiopathic."

There are few places where liver abscess can be better studied than at the Medical College, Calcutta, for the statement sometimes made that natives rarely suffer from the disease is totally erroneous as applied to India. Two years ago, while acting as pathologist for a few months at this hospital, I found that, although the thick pus of a liver abscess was often free from amœbæ, yet if a scraping of the wall was examined they could always be found quite easily. On returning to the same post with a fair prospect of at least a year's incumbency, I determined to follow up this inquiry by means of a new method in order to get a larger number of cases than necropsies afforded. At my request, my surgical colleagues very kindly obtained for me at the time of opening liver abscesses some of the pus in one sterile test tube, and in another one a small scraping of the wall of the abscess with a Volkmann's spoon. Amœbæ were sought for in this material, and at the same time cultures were made on agar tubes for micro-organisms, and the pus was frequently stained for them as well. Between the clinical and *post-mortem* observations over 30 cases have been now examined, and the results have been so uniform that I think conclusions may safely be drawn from them as far as the ordinary clinical form of liver abscess as met in India is concerned. I am greatly indebted to the kindness of the following officers of the Indian Medical Service: Drs. R. D. Murray, R. H. Charles, D. M. Moir, and R. Bird, Surgeons to the Medical College Hospital, for so supplying me with material from their cases, and to Drs. G. Bamford and G. T. A. Harris, Physicians to the Hospital, for permission to examine the cases in those wards.

Advantage has also been taken of the abundant material and records to inquire into the relationship of the disease to dysentery. For this purpose the clinical notes of the cases referred to above, and 92 other cases treated during the last four years in this hospital have been examined, and the histories obtained compared with the lesions found *post mortem*, in order to see how frequently either a history of dysentery or lesions in the bowels are found in cases which it is possible to follow up to the end. As here again the results obtained have been remarkably constant, I have further spent much labour in examining the records of over 5,000 necropsies performed at the Calcutta Medical College in the course of the last twenty-nine years, and have analysed over 200 cases of liver abscess, in many of which an abstract of the clinical records were also available, in order to see how far this large number would support the conclusions derived from the smaller number of carefully investigated cases to be tabulated in this paper. This mass of material presents many points of interest, but in the present communication I only propose to deal with it from the point of view of the frequency and type of the dysentery met with in association with tropical liver abscess.

The Constancy of the Amœba in Tropical Liver Abscess.

The first point to be dealt with is the frequency of the amœba in tropical liver abscess, by which term I mean the large single or multiple abscess which is clinically recognisable as such during life, as opposed to multiple small pyæmic ones on the one hand, and on the other the rare form of suppuration throughout the bile ducts, known as suppurative cholangitis, which is nearly always due to gall-stones (having been so caused in 18 out of 20 cases which I collected some years ago, the other 2 having been due to a primary cancer of the bile duct in one, and to a hydatid opening into the duct in the other). These latter forms are

TABLE I.—*Liver-Abscess Cases Examined Microscopically at the Time of Operation.*

Number.	Caste.	Sex.	Age.	Alcoholism.	Dysentery.	Duration of Illness.	Range of Temperature.	Amœbæ in Pus.	Amœbæ in Scrapings of Abscess Walls.	Staphylococci in Pus on Culture.	Result.
1	H	M	34	Yes	6 months ago	4 months	98·0° to 100·0°	No	Yes	Yes	Died.
2	H	M	45	No	2 years ago	1½ months	98·0° to 102·0°	Yes	Yes	—	Recovered.
3	H	M	30	Yes	Nil.	1 month	99·0° to 104·0°	No	Yes	No	Recovered seventh day after opening.
4	H	M	35		(not recorded)		97·0° to 100·2°	No	Yes	Yes	Died.
5	H	M	35	No	11 months ago for 5 months	7 months	98·0° to 101·0°	No	Yes	Nil	Died.
6	H	M	38	No	2 years ago	2 months	98·0 to 100·0	No	Yes	Yes	Recovered.
7	H	M	44	No	24 years ago	36 days	97·0° to 100·0	No	Yes	Yes	
8	H	M	40	Yes	4 years ago	2 months	Normal	No	Yes	Nil	Recovered.
9	H	M	24	Yes	Nil.	1 month	—	—	Yes	Nil	Died.
10	M	M	66	No	1½ months ago	11½ months	100·0° to 103·0°	No	Yes	Nil	Died.
11	H	M	25	(Clinical notes not available)				No	Yes	Yes	
12								No	Yes	Nil	
13								No	Yes	Nil	
14								—	Yes	Nil	Recovered ninth day after opening.
15	H	M	35	No	4 months ago	10 days	98·4° to 99·6°	No	Yes	Yes	Recovered fourth day after opening.
16	H	M	35		(not recorded)			No	Nil	Nil	Recovered twelfth day after opening.
17	H	M	40	Yes	Nil	1½ months	98·4° to 101·0°	—	Yes	Yes	Recovered third day after opening.
					Cases in which the Liver-Abscess Pus only was Examined.						
1	H	M	17	No	2 years ago	20 days	97·8° to 100·0°	No	—	Nil	
2	M	M	40	Yes	7 years ago	4 months	98·0° to 100·0°	No	—	Nil	
3	H	M	40	No	2 months ago	8 days	98·0° to 100·4°	Yes	—	Nil	
4	M	M	28	No	Nil	4 months	98·0° to 100·2°	No	—	Nil	
5	H	M	22	Yes	—	2 months	98·0° to 100·2°	No	—	Nil	
6					(Notes not available)			Yes	—	Yes	
7	H	M	30	No	Not noted	26 days	99·2° to 100·6°	No	—	Nil	
8	H	M	45	—	For 1 year	2 months	Normal	Yes	—	Nil	Recovered third day after opening.

rarely, if ever, diagnosed definitely during life, nor are they as yet amenable to surgical treatment as the tropical form nearly always is. Peri-hepatic abscesses are occasionally met with clinically, but they are nearly always secondary to a primary large abscess of the liver. Owing to the considerable number of cases to be dealt with it will be most convenient to tabulate them so as to bring out clearly the most important points, and to avoid a wearisome record of details of each separate case.

In Table I. the cases which have been examined at the time of the operation, or when the case was dressed within the following few days, are given. In the first 17 cases a scraping from the wall of the abscess received in a sterile test tube was examined, and in 14 of them some pus in another tube taken at the same time was also examined for amœbæ. In the 8 cases at the foot of the table pus only was obtained. In 12 of the first 17 cases the scraping was obtained at the time the abscess was opened, and in all of them amœbæ were easily found, nearly always in the first slide examined. On the other hand, out of 14 cases in which pus was obtained at the same time, together with the 8 cases in which the pus only was examined, making 22 in all, in only 4 was the amœba found, although more trouble was taken over examining the pus than over the scrapings. Possibly they might have been found somewhat oftener in the pus if a still longer amount of time had been spent over examining it, but even then they would not have been detected in the great majority of the cases, while by examining a scraping obtained at the time of the operation, they can always be easily detected. Further, in 5 more cases scrapings were obtained from the wall of the abscess cavity some days after the abscess had been opened, and at the time the wound was being dressed. In 4 of these, which were examined on the third, fourth, seventh, and ninth days respectively, amœbæ were readily found in an active condition, but in the fourth, which was examined on the twelfth day, when only a little thin discharge, quite different in character from the typical thick pus discharged from a liver abscess when first opened, was obtainable, no amœbæ could be found. They may very likely have been present at an earlier date, and this case is of interest when taken in conjunction with No. 2 in Table II., in which no amœbæ could be found in the wall of a liver abscess *post mortem*, it having been opened fourteen days before death, but in which amœbæ were found in chronic ulcers in the cæcum. These two cases merely show that the amœbæ may disappear from an abscess which has been opened for some days and has been discharging freely, and in no way invalidate the evidence adduced as to the constant presence of this organism in cases of liver abscess of the large "tropical" variety when first opened. If now we turn to Table II., in which are shown 20 cases of this form of liver abscess, whose walls were examined for amœbæ *post mortem*, we once more find that they were always found with the solitary exception of Case 2 already explained. If then we exclude, for the reason given, the two cases which were not examined until twelve to fourteen days after the abscess was opened, we have no fewer

TABLE II.—*Liver-Abscess Cases Examined Post Mortem.*

Number.	Caste.	Sex.	Age.	Alcoholism.	Dysentery.	Duration of illness.	Range of Temperature.	Amœbæ in Abscess Wall.	Staphylococci on Culture.	Number of Abscesses *Post Mortem*	Lesions of Dysentery *Post Mortem.*
1	H	M	50	Yes	Nil	8 days	97° to 100°	Yes	—	1 large	Ulcers.
2	H	F	30	No	Nil	1½ months	98° to 103°	No*	—	1 large	Chronic amœbic.†
3	H	M	40	Yes	10 years ago	1½ months	98·8° to 100°	Yes	—	1 large	Chronic amœbic with old scars.
4	H	M	30		(History not recorded)		98° to 99°	Yes	—	1 large	Scars of recent ulcers in colon.
5	H	M	36	Yes	Nil	1 month	98·4° to 103°	Yes	—	1 large	Nil.
6	H	M	25	Yes	(No note)	1 month	99° to 101°	Yes	No	1 large	Nil.
7	H	M	30	No	22 days ago	19 days	97° to 100°	Yes	No	1 large	Congestion and old scars in colon
8	M	M	30	Yes	2 months ago	20 days	98° to 102°	Yes	Yes**	1 large & 2 small	Ulcers and scars in colon.
9	H	M	40	Yes	In hospital	1 month		Yes	Yes	1 large	Amœbic dysentery.†
10	H	M	25	Yes	Nil	1 month	98° to 101°	Yes	Yes	1 large	Amœbic dysentery.†
11	H	M	40	No	Nil	1 month	98·8° to 102°	Yes	Yes	1 large	Scars and ulcers in caecum.
12	H	M	23		(History not recorded)		98° to 100·6°	Yes††	Yes	1 small, 1 in lung	Amœbic dysentery.†
13	H	M	45		,, ,, ,,		99° to 101°	Yes	No	3 medium	Ulcers in colon.
14	H	M	60	Yes	30 years ago in hospital	20 days		Yes	—	—	—
15	M	M	23	Yes	For 3 months	20 days	96·6° to 97·6°	Yes	No	3 large	Amœbic dysentery.†
16	H	M	26	Yes	2 years ago	—	98° to 101°	Yes	Yes	4 large	Amœbic dysentery.†
17	M	M	6	No	(Admitted for fractured femur)			Yes	Yes	6 large	Scars of recent dysentery.
18	E	M	38	—	5 years ago and recently	2 months	98° to 101°	Yes	Yes	1 large	Amœbic dysentery.†
19	H	M	22	Yes	Nil	1 month	97·6° to 98°	Yes	No	1 large	Nil.
20	H	M	22	—	2 months ago	1½ months	99° to 100°	Yes	—	1 large	Amœbic dysentery.†

* The abscess had been opened and drained for 14 days before death. † Numerous active amœbæ were found in the ulcers in the large intestine. ** Active amœbæ were also found in a scraping of the abscess wall at the operation two days before death. †† The amœbæ were found in the wall of a secondary abscess in the lung.

than 35 consecutive cases in which the amœba was found in scrapings from the wall of the abscess cavities, that is, at the seat of the active disease process.

We have next to consider if there is any other morbid factor, such as pyogenic organisms in constant or frequent association with "tropical" liver abscess, which could produce wholly, or in part, the pathological changes met with. In this connection we have to deal with the common pyogenic organisms, which are still regarded by many if not by most writers on the subject as the essential cause of the disease, even if they may sometimes be carried to the liver by means of the amœba. Turning again to Table I. we find out of 24 cases in which cultures were made from the pus of liver abscess cases in only 8 were staphylococci found, and in 2 of these only one or 2 colonies developed, which may have been accidental contaminations. In the other 5 many colonies were obtained, and in 2 of these cocci were also found in stained specimens of the pus. In the case in which only one colony developed no cocci could be found on staining the pus. In one case a short oval bacillus was obtained, which was very possibly a contamination. In the remaining 15 cases the pus proved to be sterile. Turning to Table II. we find that cultures were made in 13 cases, and staphylococci were found in 8 of them—streptococci being also found in 1, in which there was a suppurating wound in the leg altogether apart from the amœbic abscess in the liver, from which the streptococci might very possibly have been derived. In 8 out of these 13 cases the abscess had been opened during life, and in 6 of these staphylococci were found, in 1 which had been aspirated only, none were found, while in 4 which had not been operated on cocci were found in 2. Taking the whole number in both tables we have 37 cases with cocci in 16, including 6 cases in which the abscess had been opened with the possibility of infection from without taking place, as undoubtedly occurs sometimes in these cases in spite of every precaution, owing to the inveterate curiosity of the native leading him to disturb his dressings with a most exasperating levity. Including these cases, we find that the cocci of suppuration were found in fewer than half the cases, while in the pus from just opened abscesses they were obtained in only one-third. Moreover, even when present, they may not always be virulent and capable of producing pus, for in one experiment, in which liver-abscess pus containing both amœbæ and staphylococci were injected into the liver of a cat, no abscess resulted, yet the cocci were recovered from both the scar of the puncture mark in the liver and from the heart blood on killing the animal after his temperature had been normal for some days after a preliminary elevation. Pyogenic organisms, then, are only exceptionally found in active liver abscesses, and when present are not necessarily virulent and capable of producing pus.

We conclude from the above data, then, that the amœba is the only constantly found organism in "tropical" or amœbic abscess of the liver, as I think it would be more correctly called; and this leads on to the inquiry into the frequency of the association of dysentery with liver abscess, and as to the type of dysentery so related. The kind of dysentery present, whether the ordinary form, which is being traced to Shiga's bacillus with increasing frequency — this organism having been found by me recently in a few cases of ordinary catarrhal dysentery in Calcutta, and serum reactions having been obtained with it—or the amœbic form of the disease, which I have now repeatedly found in liver-abscess cases, and in them

only as a rule. The great rarity of liver abscess in dysentery cases (often termed "colitis") in temperate climates, in the epidemic dysentery of armies and in Indian gaols where only one case of liver abscess is met with in every 620 cases of dysentery, clearly shows that all forms of this disease of the large bowel are not commonly associated with suppurative hepatitis. If, however, "tropical" or amœbic abscess of the liver is only associated with amœbic dysentery, and not with the common form of temperate climates, armies in the field, and that so frequently met with in European asylums and Indian gaols, then all these difficulties will disappear. In order to prove this thesis, it will be necessary to show (1) that dysentery is present at some time or other in a very large proportion of liver-abscess cases, and cannot certainly be excluded in the remainder; (2) that the dysentery precedes in date the onset of the liver-abscess symptoms; and (3) that the dysentery of tropical or amœbic liver abscess is of the amœbic variety. These three points will now be considered in the order given in the light of the material already mentioned, the data of the cases which I have personally investigated, and which have, as far as possible, been embodied in the tables already given, being first considered, and the conclusions derived from them tested in the light of the larger number of clinical and *post-mortem* records which I have analysed.

The Frequency of the Association of Dysentery with Liver Abscess.

A brief examination of the column headed "Dysentery" and "Lesions of Dysentery *Post Mortem*" shows that in the majority of the cases there was both a history of previous dysentery, sometimes upwards of a year before, and also lesions of this disease in the large bowel *post mortem*. In other cases, such as Nos. 1, 2, 10 and 11 of Table II., there was no history of dysentery, yet lesions of the disease were found *post mortem*, and were, moreover, of the amœbic variety. It is evident, then, that clinical data alone will not afford correct information as to the proportion of cases in which dysenteric lesions are actually present in the large bowel. Nor will *post-mortem* records alone suffice, for in Nos. 2, 5, and 6 of Table III. dysentery was present clinically, at quite recent dates in two of them, and yet no lesions of the large and small bowel or other source of liver infection was found *post mortem*, so that it is evident that it is only by the examination of a series of cases in which both clinical and *post-mortem* records are available that the true proportion of cases in which dysentery is associated with liver abscess can be ascertained. In order to get a larger series of cases than is provided in Table II., a third table has been compiled from the Medical College Hospital records, in which all the remaining cases of the last four years, not included in Table II., in which both clinical and *post-mortem* records are available, are entered. Owing to the notes having been taken by native students, they are unfortunately not all complete, the history of the case not having been written up in some of them, while in others no record has been made as to whether the patient had suffered from dysentery or not. Omitting such incomplete cases, we have remaining in Tables II. and III. 24 cases[1] in which the presence or absence of a previous history of dysentery has been recorded, and necropsies subsequently made. In 14, or 58·33 per cent., of these there was both a previous history of dysentery and lesions of the disease were found *post mortem*. In 6 more, or 25 per cent., there was no history of previous dysentery, although this had been enquired for, but lesions of the disease were found *post mortem*. In 3 more, or 12·5 per cent., there was a previous history of dysentery, but no lesions were found *post mortem*, showing that the disease may subside and leave no marked naked-eye evidence of its previous existence. In the remaining one case there was neither a history of dysentery or lesion *post mortem*, as must necessarily happen sometimes, even if the disease has been previously present, owing to the occasionally mild or latent form of amœbic dysentery, giving rise to no marked symptoms during life and healing without leaving naked-eye changes after death. Indeed, taking into account the carelessness and forgetfulness of natives with regard to previous illnesses, it is very surprising that either a history of the disease or lesions *post mortem* have been recorded in as large a proportion as the 95·83 per cent. in this series of cases, and the evidence strongly points to dysentery being an invariable accompaniment of the amœbic of tropical liver abscess in Calcutta.

The number of cases, however, is too small to allow of final conclusions being drawn from them on such a vexed question as that under consideration, so we must turn to the *post-mortem* records for further evidence on the point. Owing to an abstract of the clinical histories of all cases being entered in the older *post-mortem* records of the Calcutta Medical College Hospital, a large amount of invaluable material is available for examination, while the fact that these records are mainly by that admirable physician and pathologist, the late Dr. J. F. P. McConnell, greatly enhances their worth. In this series the clinical data are necessarily less complete than the original ward notes, so that we should not expect to find quite so high a proportion of histories of dysentery as in the smaller series discussed above. The total number of cases of the large single or multiple liver abscess under consideration in which the clinical abstracts recorded whether dysentery had been present or not during life, which I have been able to analyse amount to 39. Both a previous history of dysentery and lesions *post mortem* were found in 21, or 53·85 per cent., of the cases. No history of dysentery, but lesions *post mortem*, were recorded in 7, or 17·95 per cent., making a total of 71·8 per cent. in which *post-mortem* lesions of dysentery were found. A history of previous dysentery without lesions *post mortem* were recorded in 6 more, or 15·38 per cent., making a total of 87·12 per cent. in which there was either clinical or *post-mortem* evidence, or both, of dysentery. In 5, or 12·83 per cent., there was neither a history or *post-*

[1] The last four cases in Table II. were added after the following figures were worked, and owing to one of them showing no history or *post-mortem* history of dysentery this class is raised from 4·17 to 7·41 per cent.

TABLE III.—*Clinical and Post-mortem Evidence of Dysentery in Liver-Abscess Cases.*

No.	Caste.	Sex.	Age.	Alcoholism.	History of Dysentery.	Duration of Illness.	Temperature.	No. of Abscesses *Post Mortem.*	Lesions of Dysentery *Post Mortem.*
1	H	M	40	No	3 years ago	1 year	98° to 100°	1 large, many small	Scars of ulcers in colon.
2	H	M	20	—	6 mos. ago for 3 months	?	99° to 101°	1 large	No ulcers or scars, slight congestion.
3	H	F	38	No	2 years up to 1 year ago	15 months	97° to 98°	1 large	Recent dysentery.
4	H	M	28	Yes	6 months ago	1 month	98° to 100°	1 large, many small	Ulcers (amœbic).
5	H	M	40	No	18 days	3 months	Normal	1 large, many small	Nil.
6	M	M	22	No	1 year ago	13 days	98° to 100°	1 large	Nil, but colon adherent to liver.
7	H	M	30	Yes	1½ months ago	1 month	98° to 102°	1 large	Scars of old ulcers in colon.
8	M	M	36	Yes	2 months ago	1½ months	98° to 101°	1 large	Recent ulceration.
9	H	M	25	—	No history recorded	—	98·4° to 103°	1 small	Nil.
10	H	M	29	Yes	Nil	Not noted	97° to 101°	2 large, many small	Amœbic type of ulcers in cæcum.
11	H	M	60	Yes	Not noted	1 month	—	1 large, 2 old ones	Recent dysentery.
12	H	M	40	No	Nil	2 months	Normal	1 large	Ulcers in colon of amœbic type.
13	M	M	30	No	2 years ago	1½ months	97° to 101°	1 large, many small	Recent dysentery in cæcum.
14	H	M	50	Yes	1 year ago	1½ months	98·4° to 101°	1 large, loculated	Recent dysentery, ulcers in cæcum.

mortem evidence of dysentery recorded. If we now add this series to the first one we have a total of 63 cases with complete clinical and *post-mortem* records, in 55·5 per cent. of which there was both clinical and *post-mortem* evidence of dysentery, 20·63 per cent. with *post-mortem* evidence only, making a total of 76·18 with dysentery found at the necropsy, and 14·3 per cent. in which there was clinical, but no *post-mortem*, evidence of previous dysentery, making a total of 90·48 per cent. with either clinical or *post-mortem* evidence of the disease. This leaves only 9·52 per cent. in which no evidence of the disease was obtained, a proportion which can be easily explained on the ground of imperfection of the clinical records, and to slight or latent forms of the disease producing no symptoms and healing before death took place.

We may then, I think, conclude that dysentery is constantly, or almost constantly, associated with tropical or amœbic abscess of the liver.

(*To be continued.*)

Translation.

GOUNDOU.

(*Synonyms: Anakhre = big nose; Henpuye = dog nose.*)

By Dr. FRIEDRICHSEN, Zanzibar (East Africa).

With Plate.

Translated from the German and abridged by P. Falcke.

IN February, 1901, I met a negro boy in the streets of Zanzibar who had a remarkable excrescence on either side of his nose, which I conjectured to be a case of the disease first described by MacAlister and Lamfreys in 1882 as "Horned Men in Africa," and later on (1895) reported by Maclaud from a part of the West Coast of Africa as "goundou."

The history of the case is as follows: The patient (see plate) is a boy of 12 or 13, Cheri by name, and is remarkably small for his age. His parents are Suahelis. He was born in Dengereko on the Rufiyi River in German East Africa, and was brought to Zanzibar when 3 years old, and has lived there ever since. According to his mother, soon after his arrival he suffered from swelling of both legs and from buba (the native term for yaws), during the course of which extensive ulcers developed on his legs and back. Shortly afterwards he contracted small-pox, and about two months subsequently painful sores, which frequently bled, appeared in the nose, and soon rendered breathing through the nose difficult. Gradually the swellings, as observed in the plate, developed. At first their growth was slow, but later on it became more rapid.

The growths are situated symmetrically on either side of the root of the nose on the nasal process of the superior maxilla; the upper margins reach the level of the inner angle of the eye and the lower margins extend to within a finger's breadth of the alveolar margin of the maxilla. They are divided in the centre by a groove running along the bridge of the nose. The nasal bones are not involved.

The growth on the left side is almost as large again as that on the right side, the measurements being as follows:—

Left.		*Right.*	
Length ...	3½ cm.	Length ...	2¼ cm.
Breadth ...	2¼ ,,	Breadth ...	1½ ,,
Thickness	1¾ ,,	Thickness	1½ ,,

The surfaces of the growths are quite smooth, and the skin over them normal and movable. The swellings are oval in form; laterally they are convex, and are sharply differentiated from the maxilla; towards the centre they reach as high as the level of the nasal bone.

The tumours are of the consistency of bone; the sound on palpation is dull; the probability is, therefore, that they consist of a solid mass. Palpation and pressure are painful.

The swellings intrude on the nasal space, considerably constricting the lumen; the nasal septum, however, is not implicated. The left enlargement can be felt with the finger between the lips and the alveolar process. The mucous membrane of the nose is very much swollen, and sensitive to pressure. The nose exudes a scanty clear secretion. The field of vision is somewhat obscured by the enlargements.

Old small-pox scars are seen on the trunk and extremities. There is, moreover, a radiated cicatrix,

OMUNONO (YAWS).
Illustrating Article by Dr. A. YALE MASSEY, Benguella, West Africa.

Bale and Danielsson, Ltd., London.

supposed to form the buba on the centre of the back near the spine (about 2 cm. in extent), and there are similar cicatrices on the right elbow and on the lower portions of the left and right leg. Both tibiæ are somewhat curved anteriorly. The centre of the right tibia is thickened and painful on pressure, and below this spot there are several dirty yellow ulcerations which exude a malodorous secretion. The edges of the lower incisors are deeply grooved, the edges of the upper teeth, more particularly the two front teeth, are not straight but rounded, almost triangular spaces being thus observed between them.

An examination of the swellings almost one and a half years later revealed the following changes. The size of the tumours are :—

Left.		*Right.*	
Length ...	$3\frac{1}{2}$ cm.	Length ...	$2\frac{3}{4}$ cm.
Breadth ...	2 ,,	Breadth ...	$1\frac{3}{4}$,,
Thickness	$2\frac{1}{4}$,,	Thickness	$1\frac{1}{2}$,,

The ulcerations on the right leg are partly healed, having been treated with iodoform, but there is still a heart-shaped granulation wound of 2 cm. in diameter.

There are small, hard, non-sensitive lymphatic glands in the neck and in the flexor aspect of the right elbow.

Maclaud[1] is of opinion that this disease is originated by the larvæ of insects that have by some means gained entrance to the nose.

Chalmers[2] reports the same disease from the Gold Coast, where it is known as "henpuye" (dog's nose). He believes that the tumour is the result of an osteoplastic periostitis, and attributes the condition to yaws, which almost always precedes the development of the proliferation.

Strachan[3] observed a negro child in the West Indies who was the subject of a similar swelling. It was congenital, and had increased in size. After being surgically removed the tumour was examined and found to consist of compact tissue superficially, and cancellous-looking tissue within.

Renner[4] reports a case of goundou in a negro, 39 years of age, from Sierra Leone; Graham[5] reports a case from Deli, in Sumatra, the patient being a Malay woman; Maxwell[6] notes the occurrence of goundou in a woman in South China; and Braddon[7] communicates three cases of goundou, or "gros nez," which he observed in the Malay Peninsula.

All publications on this subject show a unique unanimity in regard to the principal signs and symptoms of the disease.

Age at which the Disease Begins.—Though the accounts on this point are few, it may be assumed that goundou begins in the first two decades of life, occasionally even in early childhood.

First Symptoms.—In most cases the earliest symptoms consist of severe headaches, followed by a sanguino-purulent nasal secretion, these signs enduring for six or eight months. This symptom is absent in some cases.

Appearance of the Tumour.—A swelling ("ridge," Strachan[8]), gradually appears on both sides of the nose. I observed such a swelling in a negro youth in German East Africa (Dar-es-Salâm) in whom nearly all the long bones were affected with purulent periostitis, and he simultaneously exhibited an enormous number of ulcerations on several parts of his body.

Size of the Excrescence.—The swellings are gradually transformed into the tumours. According to Scheube[9], at 15 years of age they are the size of an almond, at 20 as large as a pigeon's egg, and at 30 as large as a hen's egg. According to Maclaud the tumours attained the size of an ostrich's egg in a man 60 years of age.

Slow Growth of the Tumours.—All authors are agreed that the growth is remarkably slow. It appears moreover, that after having grown for a series of years they may remain stationary (Maxwell); according to Scheube, however, their growth is continuous. As the tumours increase in size their sensitiveness diminishes, until finally they are quite painless. In my case, however, palpation was still painful though they had subsisted nine or ten years.

Double-sided and Symmetrical Situation of the Tumours.—All authors are unanimous in stating that the tumour is almost always double-sided and symmetrical. I was able to confirm this in my own case, but my patient's mother asserts that the growth formed first on one side and later on the other. This statement is probably true, for after a lapse of nine or ten years the growth that is said to have originated first is the larger of two. I consider this observation of importance in connection with the etiology of goundou.

Form of the Tumours.—Some observers consider the tumours are oviform, others compare them with a half-egg, flat side downwards. Maxwell says they are more round than oval. I think, however, that they may, in general, be called oval.

Condition of the Covering Skin and the Tumour.—The skin over the tumours is never adherent to them, and has several times been mentioned as being freely movable. The tumours are always of a bony consistency; their surface is smooth, they are firmly adherent to the bone beneath, and are therefore not movable. The nasal cavity is occasionally much constricted by the tumour.

I found the pituitary mucous membrane much swollen, in parts almost polypoid, and sensitive to pressure. The patient, however, could breathe through his nose with his mouth closed. The nasal septum, the nasal cartilage and the nasal bones were free. The sense of smell was maintained. The oral cavity is not attacked. When the tumours attain a certain size they limit the field of vision. According to Graham they may displace the eye, and may possibly destroy it by causing atrophy from pressure (Maclaud).

Frequency.—In regard to the frequency of the

[1] *Archive de medicine navale*, 1895, January.
[2] *Lancet*, 1900, January.
[3] *British Medical Journal* 1894, January.
[4] JOURNAL OF TROPICAL MEDICINE, 1900, January 15.
[5] *Ibid.*, August. p. 11.
[6] *Ibid.*, December, 15.
[7] *Ibid.*, 1901, May 15.

[8] Like my patient in Zanzibar he called his disease "Mti."
[9] Translation of Scheube's "Diseases of Warm Countries," Second Edition.

occurrence of goundou, it seems that it appears in some places of the West Coast of Africa lying between the fifth and ninth degree of north latitude, but is otherwise of rare occurrence. According to Maclaud it is supposed to be so frequent in the villages on the Camoë River (Ivory Coast) that from 1 to 2 per cent. of the population suffer from the disease. It is also not rare on the Gold Coast. Only one case has been reported respectively from Sierra Leone, South China and Zanzibar, but Strachan reports three cases from the West Indies and the frequent occurrence of enlargements on both sides of the nose. Four cases have been noted in Sumatra.

The majority of cases are reported in negroes, but the disease has been observed in Malays and once in a Chinawoman. It has never hitherto been observed in Europeans.

Etiology.—Many hypotheses have been advanced as to the etiology of goundou.

Braddon is the most rapid in his deductions: he could find no cause of disease in his patients, and therefore expresses his opinion that goundou is a disease "*sui generis.*"

Strachan takes the development of tumours for a species of racial peculiarity, and seeks to explain the appearance of the disease in the West Indies by heredity. This explanation, however, is not satisfactory, for the tumour is not a neoplasm, but most probably the product of inflammation, and such a disease can naturally not be hereditary.

Maclaud attributes goundou to the destructive effects of larvæ of flies in the nose; but this theory has received no support from other observers. Nevertheless, Maclaud has grasped the fact that the disease is not a new growth, but the product of inflammatory processes, though he is mistaken as to the cause of inflammation.

Chalmers was the first to throw light on the mode of origin of the tumours. In his opinion they are the product of an osteo-plastic periostitis, and are connected with yaws, as, according to his observations, they always develop during or after this disease.

The boy described by me undoubtedly suffers from lues (syphilis)—probably hereditary. This is demonstrated by his general feeble development, the bending of the tibiæ, and the peculiar formation of the incisors (Hutchinson's teeth). In some degree the statement of the mother that the boy had buba[1] (yaws) in his third or fourth year confirms this.

I take this opportunity of observing that, notwithstanding much trouble, I could not gain the conviction that there is a fundamental difference between yaws and syphilis. I am rather of the opinion of Hutchinson and Scheube's most recent publication,[2] that *yaws and syphilis are identical.*

The boy is still suffering from yaws, for the ulcers on the legs are nothing but tertiary syphilitic ulcerations, which later on were infected by so-called "tropical phagedæna."

In my case, at all events, I explain the origination of the tumours in the following manner:—

The nasal epithelium which, as a rule, is very resistent, loses its power of resistance through the previous syphilitic infection; a chronic cold sets in, perchance also ozœna syphilitica. A virus (bacterial) is now conveyed to the damaged mucous membrane by the finger "picking" the nose. In my case the virus probably originated from the ulcers on the legs. The patient has still the habit of putting his finger to his nose every moment while talking.

This virus, then, induces phagedænic ulcerations in the nose, which, after destroying the nasal epithelium, develops on the periosteum of the bones most accessible to the finger, namely, the nasal process of the superior maxilla. It is probably at this stage of the disease that the sanguino-purulent nasal discharge, which is almost always present at the commencement of goundou, appears. Later on the phagedænic virus also attacks the substance of the bone, till it finally attains the external periosteum, causing inflammatory thickening.

It is at this period that the development of the goundou tumour begins at the side of the nose and is visible on the exterior. It may be confined to one side of the nose only, but according to Scheube this is only rarely the case. It is, of course, much more natural that both sides should be affected, for the virus is conveyed to both sides by the infected finger and both nostrils yield the same favourable soil for the development of tumours.

Gradually the nasal ulceration heals up, and again is covered with mucous membrane. The purulent discharge then ceases, but the mucous membrane remains in a condition of inflammation. At this stage the nose secretes a clear fluid.

Syphilis alone is not sufficient to explain the formation of goundou, for were it the sole cause the disease must occur much more frequently and would also appear in temperate climates. It is highly probable that in my case the microbes which cause tropical phagedæna (and the nature of which is unknown) were responsible for the disease. This hypothesis is supported by the fact that even at the time of my examination the boy was afflicted with phagedænic ulcerations on his legs, and the circumstance that tropical phagedæna often causes extensive thickening of bone through periostitis ossificans; the process may continue, though the ulcerations have healed.

I have no sound arguments to advance as to the reason for the frequency of goundou on the West Coast of Africa and its rarity in most other tropical countries, but I may point to the coincidence that syphilis, *i.e.*, yaws, is remarkably frequent in the principal region of distribution of goundou. Fisch reports from Aboori (Gold Coast) that about 30 per cent. of the total population and from 60 to 70 per cent. of his patients suffer from syphilis, and he mentions that "a rupia-like and decidedly syphilitic skin disease is frequent, amongst children in particular, and is usually designated yaws."

According to Hey, syphilis is still more widely dis-

[1] Buba is the Suaheli term for the proliferations of yaws; the name probably dates from the time of the Portuguese (about the sixteenth century). Scheube also, in *Die venerischen Krankheiten in der warmen Ländern*, Leipzig, 1902, p. 52, observes: "Yaws on the Antilles as well as in Brazil is called buba, and this is the term by which the Spanish authors, Oviedo and Las Casas, designated syphilis."

[2] Scheube, *Die venerischen Krankheiten in der warmen Länder*, Leipzig, 1902, p. 51.

tributed in the Odoumase (West Coast, Gold Coast). Perhaps the moisture of the atmosphere favours the formation of the tumours, provided other etiological agents of the disease are present.

Treatment.—Little can be expected of treatment in these proliferations, the growth of which is so remarkably slow. Once the tumour has commenced to develop—a symptom that the bone is diseased—only operative removal is of use. It may, however, be taken for granted that the disease may be combated during the first six or eight months, *i.e.*, as long as the sanguino-purulent nasal discharge is present, by escharotics (argent. nitr., acid chromic., 5 to 10 per cent. solution, particularly also chloride of zinc, 50 per cent. solution), which destroy the phagedænic ulcers); an anti-syphilitic treatment may also be given.

I have attempted in this article to furnish a faithful description and an explanation of the nature of the remarkable disease goundou, or anakhre. I fear I have only partly succeeded, the material at my command being so scanty. I trust, however, that my observations will lead to the publication of other works, for which there is abundance of material on the West Coast of Africa.

Reprint.

HÆMATEMESIS IN PERNICIOUS MALARIA.

By Francisco T. B. Fest, of Tegucigalpa, Honduras.
Professor of Medicine, University of Honduras.

Patrick Manson states in his famous "Tropical Diseases" (p. 107): "*In high degrees of cachexia*, hæmorrhages of various kinds are apt to occur—epistaxis, hæmoptysis, hæmatemesis. . . . In such cases trifling operations—tooth extraction, for example—may prove a dangerous matter." . . .

Experience causes me to take exception to the above statement, as far as *high degree of cachexia* is implied as the limit of said hæmorrhages. In cases of severe infection, even of relatively short duration, these hæmorrhages may occur as well as in chronic cases. Naturally chronic cases are more apt to suffer. For example, it is frequently observed in the coast part of this country, that women suffering from chronic malaria are predisposed to menorrhagias and metrorrhagias. In fact, this condition among the poorer classes, especially half-breeds and Indians, is the most frequent ailment for which the physician is consulted. The rapid effect of quinine and iron in many of these cases establishes their purely malarial origin.

Following are given a few cases of hæmatemesis under my direct observation during the last two years:—

Case I.—W. B., aged 12, boy, of American-Swedish descent. Up to this time was well. Tuesday evening had a chill, followed by high fever. Wednesday became comatose. During the night hæmatemesis and epistaxis set in. Was in a moribund condition Thursday when I saw him.

Case II.—Ladino, aged 35; alcoholic. Had enlarged spleen. History of tertian attacks for about a week. Had taken daily 100 grains of quinine without benefit. The day before I was called he had a very severe chill, and had been in a comatose condition since. Found him with a temperature of $103\frac{1}{2}°$, pulse 120. Since previous night there was hæmatemesis. According to the statement of his woman, the vomiting consisted first of a black mass, like ground coffee; later it became free blood. There was also hæmatochezia. The eyes had a yellowish hue, and the case was considered yellow fever. Examination of the blood showed malignant tertian bodies. As hypodermic medication was refused by the half-savage attendants, I retired from the case. The man died the same day.

Case III.—Half-breed, aged 9. Had intermittent fever for several weeks. A kind of black vomit began about two days before. There were also sanguinolent stools. The blood of these was not coagulated. A small swallow of water would cause spasmodic vomiting, followed by liquid blood. I at once gave quinine subcutaneously, followed by a high enema of normal salt solution and followed by stypticine. After three hours the latter was repeated, with a little codeine, as the vomiting was incessant. During the night the vomiting ceased. Next morning the quinine was repeated, also the enema. Milk was given and retained. The following day administered euquinine and broth. Speedy recovery followed the above treatment. The spleen became enlarged during the illness, and remained so to a certain degree.

Case IV.—Catalina B., aged 24, Spanish descent. Daily ague for four days. Temperature 104°, pulse 102. In the fifth month of pregnancy. Eyes and skin marked yellow hue. Spleen hard and painful. Constipated for three days, although the patient had been given 1 grain calomel the day before, followed by 2 ounces of castor oil. Complained of burning pain in stomach and bladder. Most of the time comatose and delirious. Since previous day vomiting bilious matter and free blood in large quantities. In the morning began also moderate hæmorrhage from the genitals. A copious enema of pure water, bringing about evacuation, was given at once, followed by a retention of enema of salt solution.

Injected one litre of normal salt solution in two administrations. Gave quinine hypodermically and stypticine in the same way. The latter was repeated every three hours. The quinine was repeated next morning, when I found the patient perspiring freely and with clear sensorium. The temperature was then only 99·3°. Gave per orem menthol and codeine, and afterwards a little milk, which was retained. The metrorrhagia had not ceased entirely, and I repeated the astringent during the day. Next day no hæmorrhages; gave milk, raw eggs and broth, and repeated the quinine, which was exchanged the following day for euquinine per orem. Daily gram doses of euquinine were kept up for a week. *Neither this nor the daily injections of 100 grains of neutral hydrochlorate of quinine had caused any abortion, in spite of the uterine hæmorrhage.* The woman gained her strength only slowly, and gave birth at term to a small, weakly child *with enlarged spleen, which soon died—a case of fœtal malaria.*

CASE V.—Antonio R., aged 35, Ladino. Was working in a cattle ranch up to two days within death. I knew him as a strong, hard-working man, with a moderately enlarged spleen, and on pay-days fond of a spree. His illness began with a chill after a day's dissipation. I found him comatose; temperature 104·1°, pulse thin and rapid; was lying in a pool of blood; had free epistaxis, hæmatemesis and hæmatochezia. Injections of saline solutine and other remedies were refused. He died the following night. The blood showed again the malignant tertian bodies.

Necropsy.—Only brain, stomach, liver and intestines presented abnormalities. In the brain were many dots of fine thrombi, not of the usual red colour but black; also many engorged capillaries. The stomach was full of black blood, the walls injected, at places eroded and friable. The intestines in same condition. The spleen was large, with necrotic spots and pigments. The liver also showed accumulation of pigment.

All these cases are alike in some respects. In the blood I always found the varieties of malarial plasmodia that belong to the æstivo-autumnal group, described by Marchiafava and Bignami as the malignant tertian parasite. The number was always exceedingly large, and the parasite itself of enormous size, with many highly-pigmented bodies present.

Not one of these patients was really cachetic. I selected these five cases because they were not cachetic. With cachetics, as Manson said, the hæmatemesis is not uncommon. I wish to prove the *high degree of cachexia* is not alone a causative factor in the hæmorrhages. Enlarged spleen is not absolutely an indication of malarial cachexia. As a rule, most malarial cachetics show splenic tumours, yet I know individuals whose health apparently (with the exception of a spleen remaining large) is restored. I say *apparently.* They are not cachetics in the true sense of the word, as all symptoms of ill-health have disappeared with no discomfort other than an irregular girdle. I met such a case in Japan; he was a good mountain climber, very good at the bowling alley, a very strong hand at the bar, and untired in the cult of Venus. Ten years before he suffered much from malaria; had to go to Europe, and returned one year after in the condition I met him. Certainly he will pay some time for his irregular life, but he certainly was not cachetic at the time. In San Francisco I met a lady of apparently good health, a good bicyclist, regular visitor to the Rockies; was very active in social and charity work, yet she had a large waist due to a splenic tumour, a relic of some years' sojourn in Panama. I know also, and this time very well, a medical man who several years ago went to the South of China. Ten days after his arrival he suffered from his first ague. During his whole residence there he had always more or less a slow fever, even some apoplexy-like attacks, most likely of malarial origin, malarial hæmorrhage into the brain. He spent the winter in the United States, and came then into Central America; began his career there in a swampy district as surgeon of the troops. He had to lead a very unhygienic life, camped out often, frequently not protected against the swarms of mosquitoes for three weeks at a time; exposed himself many a day to the tropical beach. At the beginning he sometimes has ague. Now he appears immune. He is fond of outdoor sport, and has a good deal of it. He weighs more than ever, far over 200 lbs., leads a very active life, and is considered in all respects a very strong man. Yet he has a Chinese relic, a somewhat enlarged spleen—which, however, never troubles him. Furthermore, I know an old English resident, with over thirty years' hard work in Central America; he passed through severe fevers, even hæmatemesis. He complains only of the prominence of his splenic tumour. He is working quite hard in his placer mine at present, and is free from all complaint. These cases I cannot consider as splenic cachexia. I believe the term cachexia is only proper with chronic malaria, when we have progressive anæmia. As I have shown, there can be a large spleen without anæmia; the cases may be rare, but they exist.

Excluding cachexia, we notice that some of the cases were alcoholic. These seem to have predisposition to hæmatemesis, especially after exposure to the sun. Exposure to the sun predisposes in favour of the comatose type (Bacelli). It is not uncommon that newcomers, after a spree, come down with fever, as is often the case with sailors, who spend only a few days ashore. The abuse of alcohol seems to favour the development of the parasites. If malarial individuals, or those just recovered from a first attack, go on a spree, hæmatemesis is sure to follow. I know of such cases that were picked up comatose in a pool of blood, and were sometimes mistaken for cases of delirium tremens. I have seen such a case, a shipmate in Hongkong. Overheating of new arrivals in a malarial region seems to be favourable for the development of the hæmorrhagic type. When I took charge of the garrison of Truxillo, I found in the lazaretto many soldiers suffering from what I considered then to be dysentery. The presence of parasites and the success with anti-malarial treatment proved clearly that I had to deal with malarial hæmatochezia. Amongst the residents I never met this form. I am told that in a former campaign, when the town was crowded with soldiers, this type was epidemic and many died. The recruits come, as a rule, from the cooler mountainous interior. Their manner of life was changed at once. Their food was different. At home, as a rule, they did nothing or but little more, their women doing the work. They busied themselves with their hammocks, except working their fields for a few days in the month and hunting in the shady forests. Now they had to do duty on the hot beaches and in the stony fort without protection against the sun. As a rule expeditions moved at night, but often also during the day. Such a march along the beach means more than only exposure to the sun. The route is invariably along the seam of the sea, because the sand is moist and hard. At one side high drifts of white sand, that reflect not only heat but also light. At the other side the always rough sea, that also reflects heat and light better than a mirror. The monotonous sound of the breakers tells on the nerves. From above, the tropical sun. The slightest breeze

fills mouth, ears, nose, and eyes with fine sand. No water, at least no good water, for sometimes ten miles. Thirty miles only are considered a fair day's march. One riding such a distance will feel feverish at night, when he finds only jerked beef and beans or plantains as food and a hammock as a bed where he can protect himself only partly against the ever-present mosquitoes. How much more will the degenerate Ladino suffer, who has to walk and often sleep on the ground, filling his stomach with brackish water and stale fruit. Naturally his first malarial attack will derange the alimentary apparatus and cause the hæmatochezia just mentioned.

Although the five cases of pernicious malarial hæmorrhage I described were the only ones of non-cachetics under my direct observation, they are by no means very rare. In fact, they are taken frequently for yellow fever, because the patients die in relatively short time, and often show the icteric hue. I know of a healthy child that was taken to the coast and died within twenty-four hours after the first and only chill, of "vomito-negro." No wonder the natives fear so much the "vomito-negro"—black vomit. Usually only natives succumb, foreigners form the exception; while with yellow fever the foreigners die and the natives form the exception. No more than a few days ago a prominent colleague of this faculty, who had just returned from the Pacific coast, told me, when asked about the yellow fever rumours, that he had examined the suspected cases and that they belong to the type just described.

How do the hæmorrhages occur? My fifth case, on which I performed autopsy, gave me the key. The blood shows abundance of plasmodia malariæ. The pigments increase the coagulability. The brain was studded with many fine hæmorrhagic pigments. The small size is accounted for by the quickness of coagulation. The enlarged blood corpuscles block the lumen of the capillaries, and the thrombosis occurs. All of my cases were comatose; this coma is due to the enlarged capillaries and the consequent pressure. The hæmatemesis is caused by a similar process in the mucosities of the stomach. The convulsive contractions during the vomiting strains the engorged capillaries and they rupture. This process also accounts for the shape of the coagula. Only when larger vessels rupture have we free hæmorrhage. If the individuals are alcoholics, the mucosity is already in a state of congestion, and consequently the hæmorrhage with them is mostly free. That these cases occur at all is due to the severity of infection.

Bassere (*Archives d'Ophtalmologie*, June, 1896) describes twelve cases of malarial retinal hæmorrhages with the Madagascar troops. The hæmorrhages occured suddenly, often at the height of the first attack of fever.

There is no reason to exclude analogous processes in the intestinal tract, and *cachexia is therefore no necessary condition.*

As to the treatment, it must be anti-malarial. Quinine is always indicated in these cases. The more severe the case the more exact the indication. Not to lose time and not to exhaust the patient by provoking more vomiting, we must resort to hypodermic medication. We are sure then that the necessary quantity of the medicament is introduced into the system. Less than 100 grains is hardly sufficient, and the more severe the infection the larger the dose that can be administered without undue effect. Not until the stomach is absolutely at rest can medication per orem be considered proper; but even then never in form of pills or capsules. If only bitter salts on hand, wafers can be used. I prefer to use euquinine, inasmuch as the acid of the stomach probably reduces the quinine ethyl carbonate to quinine, and therefore the action is the same; cinchonism occurs just as well as with quinine, amaurosis may sometimes follow its use; but the bitter taste of quinine is thus obviated. We cannot deny that the bitterness of quinine is often sufficient to cause vomiting. Therefore my principle is to inject the neutral hydrochloride until enquinine can be taken. Stypticine controls the hæmorrhages in these cases, as well as in those due to tubercular processes.

If the hæmatemesis has been excessive, an injection of the normal salt solution should follow the administration of quinine, not only to prevent collapse, but also to dilute the blood and thus diminish the formation of the capillary thrombi.

Correspondence.

METHOD OF MOUNTING SPECIMENS OF BILHARZIA EGGS, FILARIAL EMBRYOS, AND SMALL WORMS OF ANY KIND.

We received the following enquiry from Dr. A. Yale Massey, American Mission, Benguella, West Africa, and we referred the matter to Dr. G. C. Low, the Superintendent of the London School of Tropical Medicine. We believe the information so kindly communicated by Dr. Low will prove useful to others.

Dr. Massey's Enquiry.

Could you inform me as to a method of properly mounting slide specimens, permanently, of such as bilharzia eggs, the filariæ, small worms of any kind, eggs of intestinal parasites, and the like?

Dr. G. C. Low's Reply.

In reply to the above letter we have much pleasure in giving Mr. Massey some of the usual methods employed for making permanent preparations of the objects mentioned.

For filarial embryos a large drop of blood is placed on a slide, spread out so as to form a film, and then allowed to dry. After this it is placed in water till all the red colour of the blood disappears, and then a few drops of any common stain, such as fuchsin, methylene blue, or hæmatoxylin are applied for a few minutes. Wash again in water, dry, and mount in Canada balsam.

Small worms, such as *Trichocephalus dispar*, *Ankylostomum duodenale*, are best placed for a few days in 2 per cent. formalin, then in glycerine, and from this into glycerine jelly, in which they are mounted.

Bilharzia eggs for permanent preparations are obtained by mounting the little shreds of mucus passed with the urine in glycerine or glycerine jelly.

Eggs of intestinal parasites in fæces are best mounted in formalin solution, 5-10 per cent.

In all those methods where glycerine, glycerine jelly, or formalin has been used it is important to remember that the cover-slips must be ringed with Canada balsam or asphalt

to prevent the subsequent evaporation of the medium which always takes place.

With a very little practice very beautiful permanent specimens may be obtained by any of the above methods.

Instruments.

An Improved Field Service Filter.

We have had brought to our notice a field service filter invented by Messrs. Slack and Brownlow, of Gorton, Manchester. It is claimed for the filter that not only does it remove the grosser impurities from the water, but that it also possesses a marvellous power in arresting germs. By a simple arrangement the filter can be cleaned and rendered fit for further service. We hope on further acquaintance with the power of this filter to render water fit for consumption to bring Messrs. Slack and Brownlow's invention prominently before our readers.

Reviews.

The Nurse in Hot Climates. By Edward Henderson, M.D., F.R.C.S.Edin., late of Shanghai, China. Pp. 47, with Illustration. The Scientific Press, Ltd., 28 and 29, Southampton Street, Strand, London. 1903.

Dr. Henderson has written a most useful book for the nurse in hot climates. His long experience in Shanghai entitles him to speak with authority, and he gives the results of his observations in a practical and readily understood form.

The nurse trained in a British hospital will find Dr. Henderson's book of great help when she proceeds to a hot climate to take up work there. The diseases in a hot climate the nurse has to deal with are, for the most part, wholly new to her; the climate, the hospital fittings, the attendance, and the appliances are also not of the kind she has been accustomed to, and she has to adapt herself to her surroundings. To enable her to do so, she will do well to acquaint herself with the contents of "The Nurse in Hot Climates," and to keep the book by her as a ready guide in difficulty. We would also recommend every woman who resides in a hot climate to procure this work, for trained nurses are few and far between in most of our colonies, and any woman may be called upon suddenly to nurse members of her own or her neighbour's household.

To fit the home-trained nurse for work under the altered conditions of a hot climate is Dr. Henderson's aim, and the book he has given us fulfils its purpose admirably; but we would recommend also that a copy of the book be kept in every British household in hot climates.

Notes and News.

Tetanus after Plague Inoculations in the Punjab.—A Committee, consisting of Sir Lawrence Jenkins, Chief Justice of Bombay, Lieutenant-Colonel G. Bomford, C.I.E., Principal of the Medical College, Calcutta, and Major Semple, R.A.M.C., has been appointed to inquire into the recent cases of tetanus arising after plague inoculations in the Punjab. Some nineteen deaths from tetanus occurred as the result of inoculation, and it is stated the contaminated serum was obtained from a single bottle.

The Prize Competitions.—We have already received one paper for the Lady McGregor Prize Competition—"A Critical Examination of the Practical Value of Anti-typhoid Inoculation."

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—MARCH 2nd, 1903.

Original Communications.

ORIENTAL SORE WITH SPECIFIC ORCHITIS.

Communicated by Dr. Manson, C.M.G., F.R.S., LL.D.

The fact that in the vast majority of instances one attack of Oriental sore conveys immunity proves (1) the specific nature of the skin lesion, and (2) that the development of the local lesion, as in vaccinia, is associated with constitutional changes which result in the immunisation of the tissues of the entire body. Occasionally, as in vaccinia, immunity is weakened and finally lost, and as a consequence second and even third attacks of Oriental sore are met with; but until I saw the following case I had never encountered an instance of the disease in which immunity was so difficult to establish or in which there occurred well-marked visceral lesions. The disease in this instance seemed in these respects to approach syphilis, or those cases of yaws with tertiary phenomena.

P. S., aged 33, married eighteen months, had resided about four years in Arabia. While there he suffered once or twice from mild attacks of malaria, twice had dysentery, and in his second year of residence he suffered from a large Oriental sore on the left forearm. A year later he was again attacked by Oriental sore; on this occasion there was no ulceration, only an inflammatory area, unassociated with pain or tenderness, the region involved was the proximal phalanx of the third finger of the left hand. The patient had never suffered from any venereal disease.

Six months after his return to England he weighed more than he had previously done in his lifetime, and while enjoying excellent health, a hard nodular swelling developed in the globus major of the left epididymis. It enlarged with much rapidity, tenderness developed, and in about three weeks this tenderness became most acute, and was associated with severe pain of a dragging character, which was only relieved, and that immediately, on the patient lying down. The vas deferens gradually thickened and became slightly tender. About three weeks after the swelling was first noticed the right epididymis became involved in a similar way. The case was diagnosed as one of tubercular epididymitis of an acute variety, though presenting very unusual features. The prostate and vesiculæ seminales were examined, but no trouble was detected. The left testicle was excised, and the affected portion of the right epididymis. The patient made an uninterrupted recovery, though a tender spot remained on the right side, between the scar tissue and the testis.

Six weeks after the first operation the trouble again showed itself in the remaining part of the right epididymis and the part of the testis adjoining. On this occasion the course was much more rapid and the pain and tenderness far more acute. This, the remaining epididymis and testis were then excised.

Just before the first operation, the patient had what appeared to be a chronic boil of the left leg, and also one of a subacute nature on the right forearm. After the operation, the one on the leg opened and blood-stained fluid exuded. The one on the forearm was incised, but instead of pus being found, a similar blood-stained fluid escaped. By the time of the second operation these two places were large ulcerating areas, typical Oriental sores. Some months later they began to gradually close up; they were much more painful than the one the patient had while in Arabia.

In the interval between the two operations, the proximal phalanx of the third finger of the left hand became slightly tender on being firmly pressed. After the second operation, this phalanx swelled up very rapidly and became very tender and could not be bent without great pain. Scott's dressing was applied and the hand put up in a splint. In a month the swelling was gone, and very little pain remained.

At the time of the first operation, a small nodule—the size of a split pea—was noticed over the right tibia; at first it was freely movable under the skin.

No attention was paid to it as it appeared to have no reference whatsoever to the case. After the second operation this nodule gradually enlarged, without the skin becoming red, though for a radius of about two inches around the nodule there was much œdema. The nodule soon became immovable, and it seemed to be a case of chronic periostitis, possibly tubercular. The centre of the nodule (then about the size of a shilling) softened, and under the impression that pus was present, an incision was made, but only blood-stained fluid escaped. The incision healed by primary union, and in about three months all traces of the swelling were gone. About the time this nodule was incised there were felt, in the last inch or so of the penis, four or five hard swellings situated apparently in the urethra. There was tenderness on pressure and a sense of itchiness in the urethra, while on micturition the stream was forked. These swellings lasted about three months, and during that time, on two occasions, there was noticed on pressure about half a minim of pus at the meatus.

At the same time there was a very small ulcer on the frænum; it was slightly painful and was quite superficial. No lymphatic glands enlarged, and in a month it closed without leaving any scar.

Concurrently with this, two nodules were noticed on the forearm close to the Oriental sore, now healed. They were slightly tender, and very much resembled the Oriental sore on the arm in its earliest stage. After very slowly enlarging for some two months—the skin over one of them becoming slightly red — they gradually disappeared.

The patient, after the second operation, made rather a slow recovery, owing to pain in the Oriental sores on his forearm and leg, and to the depressing view he took of his condition. At the present time he is very well indeed, and says he never felt better in his life.

THE ANTISEPSIS OF MAJOR EYE-OPERATIONS, AS PRACTISED BY SOME OF THE LEADING OPHTHALMOLOGISTS OF EUROPE.

By R. H. Elliot, M.B., B.S.Lond., F.R.C.S.Eng., Capt. I.M.S

During the last year it has been my good fortune to have been able to visit a number of the principal eye-clinics in Italy, Switzerland, Austria, Germany, Belgium, Holland, Poland, Russia, Denmark, Sweden, France and the United Kingdom.

The Madras Government, whom I have the honour of serving, most kindly obtained for me through his Excellency the Secretary of State for India, introductions to the various European Governments, who in their turn most kindly called on the Superintendents of their respective hospitals to give me all the assistance in their power. It would be difficult for me to overestimate the kindness and attention I received.

Among the many interesting features of the work which attracted my attention, the most striking by far was the extraordinary diversity of methods employed by different ophthalmologists in order to obtain the same results. Extracts from my original notes are being published in the *Indian Medical Gazette*, and in this paper it is my intention to illustrate the diversity of methods which I have seen employed by reviewing and comparing the measures adopted in different clinics for the attainment of antisepsis. I do not pretend that the survey is exhaustive of European practice; it is essentially limited to my own experience during my recent tours. I have dwelt little on British surgeons' methods, since most of us are more or less familiar with them, and I have only alluded to Indian experience where it seems to me to be of more than ordinary interest. Each heading of the subject will be dealt with in turn.

The Sterilisation of Instruments.

There is no department of the antiseptic *régime* on which I found surgeons so unanimous as they are on this. Fuchs says: "The infection of wounds, in fact, occurs . . . mainly from contaminated instruments; and it is to the sterilisation of these that our attention ought, above all, to be directed. Even De Wecker, who teaches the practice of antisepsis, "*sans toutefois tomber ici dans l'excès*," urges "the need of paying the greatest attention to the perfect sterilisation of our instruments." Different surgeons use widely different methods to attain this object, so that it will facilitate our comprehension of the subject to divide it into three heads, viz.: (1) the employment of moist heat; (2) the employment of dry heat, and (3) the employment of various antiseptic solutions.

(1) *Moist heat.*—A large number of surgeons boil *all* their instruments, those with cutting edges not being excepted. Most, if not all of them, admit that this is very bad for the knife. Hirschberg and some others hold the knife with its blade in the boiling fluid for a short time, instead of placing it in amongst the coarser instruments. Nordensen does the same, but first removes all grease by dipping the knife in a mixture of alcohol and ether. Most surgeons are content to use ordinary water to which sodium carbonate has been added; some use plain distilled water, and others, again, add the sodium salt to distilled water before ebullition. My own habit has been to sterilise *all* my instruments by steam heat in my private practice, and I have found this both clean and effective; moreover, it is harmless to even the cutting instruments. For hospital practice, I was obliged to use boiling water, for want of steam-sterilisers, and I found it so hard on the knives that I had to give it up, in view of the large number of operations performed, and the expense that persistence in the method would have involved. I fell back on a careful cleansing of the knife with sterilised wool and water, and as I only used Weiss's knives, whose high polish does not admit of their harbouring dust, I had no reason to complain of the results. Juda, of Amsterdam, likewise excepts his knife from boiling; he soaks it for twenty minutes in sterilised soap-solution, and then carefully washes it with sterilised wool and water.

(2) Not a few surgeons prefer *dry heat*, and treat all instruments alike; their experience seems to be that this is far less hard on the knife than moist heat is. Very different degrees of heat are used. Thus Adelheim, of Moscow, keeps his instruments at 105°C. for half-an-hour; Krukoff does the same; Nordensen is trying dry

heat at 150°C., and De Wecker heats his instruments up to 160°C., and then lets them cool in the autoclave.

(3) I met but very few surgeons who trusted to the *simple soaking of their instruments in an antiseptic solution*, and I observed that those who did so were very careful as to their previous preparation. Thus Professor Schroeder, of St. Petersburg, first washes all his instruments with a mixture of alcohol and ether, then cleans them with soap and water, from which he transfers them into a one-per-cent. biniodide solution for ten minutes, and finally leaves them in a $\frac{1}{1500}$ solution of biniodide till they are required for use. De Haas, of Rotterdam, relies upon absolute alcohol as his antiseptic for instruments, but does not leave the cutting instruments long in this fluid.

It is surprising to find how many ophthalmologists combine two of the above methods in their practice. Trousseau soaks his instruments for fifteen minutes in absolute alcohol, and then boils them in solution of sodium carbonate; Hansen Grut and Bjerrum transfer theirs to a solution ($\frac{1}{5000}$) of perchloride after boiling, and Rogman follows the same practice, but substitutes cyanide (in $\frac{1}{1000}$ solution) for the other salt of mercury. Of those who employ dry heat, I noticed that Adelheim, of Moscow, transferred his instruments to $\frac{1}{5000}$ biniodide solution, while Krukoff had each instrument dipped into boiling water by an assistant before it was handed to him.

Though all the surgeons I saw at work were thus careful about the initial cleansing of their instruments from septic matter, I cannot say that all were equally consistent afterwards. Most of them washed their hands carefully between each two operations, and then soaked or often only dipped them in an antiseptic solution; others considered one sterilisation of the hands enough for a series of operations; some were rigidly careful to avoid touching any object after they had cleansed their hands, whilst others dipped into their pockets for spectacles, or other articles, in a casual way; some allowed no one but themselves, or perhaps a trusted assistant, to touch their instruments, whilst I observed more than one distinguished surgeon hand an instrument to a bystander to hold for him. Lapersonne passes every instrument through a flame before using it a second time; others have them dipped in boiling water before each fresh use, while Landolt, and one or two others, keep duplicates (in the case of much-used instruments triplicates) ready sterilised, so that the necessity for re-use need never arise. On the other hand, I have seen surgeons dip curettes, &c., into the eye again and again, and commit other equally gross or grosser infractions of antiseptic *régime*. Landolt and Abadie sterilise all vessels used in their theatres by igniting ether in them before use. Landolt uses a special sterilised soap supplied in tubes.

Comparatively few surgeons seem to think it worth while to protect their hands from risk of contamination by covering the patients' faces during operation. Professor Greef, of Berlin, is an exception to this rule, as are a few others. Greef places a mask of lint soaked in an antiseptic solution (perchloride of mercury, $\frac{1}{5000}$) over the face; while Lapersonne, of Paris, prefers to use a number of cloths wetted with biniodide lotion, which he carefully arranges around the eye. A few surgeons confine female hair in rubber bathing-caps to keep it out of the operation area. I noticed this being done in both Landolt's and Völcker's clinics. De Wecker ridicules all such measures as "*l'antisepsie d'ostentation*," but his own methods are far from being above all criticism in respect to the completeness of his antisepsis.

NUMBER OF INSTRUMENTS USED.

Trousseau limits himself to one instrument, a narrow knife, and he hopes thereby to minimise the danger of infection from his tools; but, to my mind, he introduces far more serious risks of sepsis than he escapes, since he cannot keep the lids, &c., from contact with his knife. Fuchs and Masselon are at one with him so far as the omission of a speculum is concerned; both of them entrust the upper lid to an assistant, instead of using any form of blepharostat. Whilst on this subject, a short digression on the subject of the different kinds of specula I have seen used may be permitted.

Nearly every surgeon seems to have a model of his own. Some insert the instrument with its arms over the patient's nose; a few even go so far as to provide a bridge whereby it may rest on the bony nose; others prefer to have the shanks on the temporal side. Amongst the former are Sbordone, of Naples; Rogman, of Ghent; Hansen Grut and Bjerrum, of Copenhagen; and Landolt, of Paris; whilst the latter class includes many well-known European ophthalmologists. Even amongst these latter a great difference in practice is found, for some like to have the speculum carefully held by an assistant, whilst others leave the instrument free. Some operators prefer a stop speculum, and others are careful to avoid the stop, which they look on as a useless and hampering complication. French surgeons are very partial to the use of blepharostats, whose blades are hinged on to the shanks. Some use a weak spring, whilst others again prefer a strong one. Some surgeons leave the speculum in throughout the operation; others remove it as soon as the incision has been completed; and yet others take it out after the iridectomy, or after the laceration of the capsule.

To return to our subject, which was the influence of the number of instruments on the attainment of antisepsis. Masselon comes next to Trousseau, inasmuch as he only uses two instruments, viz., a pair of conjunctival forceps and a narrow knife. At the opposite extremity of the series one finds Landolt, who not merely puts out every instrument he thinks he is at all likely to want for any complication that may arise, but also keeps duplicates ready of any part of his armentarium which may be required more than once. It is needless to dilate on the practice of the many who fall between these two extremes.

PREPARATION OF THE PATIENT FOR OPERATION.

As this consists of a number of different steps, it will be better to take them in turn, only premising that the attention to detail bestowed on the whole process by different surgeons varies enormously.

Preliminary.—Many operators are of Landolt's opinion that it is a great advantage to keep the patient in bed, or at any rate in hospital, for several days before submitting him to any severe eye operation, such as cataract extraction; they think that it is no

small gain to get the individual used to his new surroundings. At the same time, they take the opportunity of regulating his bowels, thoroughly cleansing the skin area around the eye, and learning all they can of his health. De Wecker, on the other hand, does not hesitate to take a patient on to his operating table straight from the out-patient room for even so severe an operation as cataract extraction. Moreover, he is of opinion that soap irritates the conjunctiva, and therefore will not allow the lids to be cleansed therewith before operation. Between these two extremes of method, one finds the practice of other ophthalmologists arranged *en échelon*.

CLEANSING OF THE SURROUNDING SKIN.

Most surgeons prefer to have the skin of the lids and face well washed with soap and warm water the night before operation, and not a few repeat the process after the patient is brought on the table; this duty being usually relegated to an assistant. Fuchs is opposed to soap being brought in contact with the eye immediately before an operation if avoidable, and therefore limits himself to using it on the previous day. Again, there are those who do not lay much stress on careful soapings on the days preceding operation, but who are most particular about thorough washing with soap and sterilised water just before commencing. In any case, most operators wash the lids with an antiseptic solution immediately before setting to work. Speaking in general terms, the solutions preferred are decidedly stronger than those used to irrigate the conjunctival sac, but they present an extraordinary amount of divergence, not only in strength but also in character. Thus we find Fuchs using $\frac{1}{2000}$ perchloride solution; whilst Hansen Grutt and Bjerrum prefer the same fluid at $\frac{1}{6000}$; again, Pagensticher has not had a suppuration in twelve years with $\frac{1}{5000}$. Then there are other mercurial salts in use; Trousseau employs the cyanide, Lapersonne the biniodide, and de Wecker the oxycyanide (one per cent.). To complete a quartette of famous Parisian ophthalmologists, one has only to add that Landolt, one of the most careful and thorough eye surgeons I have ever met, uses no antiseptic for the face, but trusts to careful washing with soap and warm water. The late Professor Panas advocated[1] the application of a solution of biniodide of mercury in sterilised olive-oil at a strength of 4 per 1,000; this was to be soaked into a lint dressing which was kept on for twenty-four hours, and only removed on the operating table. Lapersonne speaks highly of the method. Völckers, of Kiel, keeps the eye covered for an hour before operation with a pad of lint soaked in a $\frac{1}{1000}$ solution of perchloride of mercury.

TREATMENT OF THE LASHES.

The majority of surgeons do not touch the cilia, and I have not infrequently seen a skilful surgeon fall foul of these small hairs with his knife while all unconscious that he had done anything so dangerous. Indeed, on one occasion, a surgeon gravely informed me that he never had any difficulty in avoiding the lashes with his knife, and yet I had just had ocular demonstration to the contrary. A few operators cut the upper lashes only, and amongst these one may mention Von Michell, of Berlin; others cut the lashes of both lids; whilst I limit myself to cutting those on the temporal half of the upper lid, thus protecting my knife at the expense of a minimum of mutilation. Nordensen follows Schiötz in epilating both lids entirely, and he assured me that it was not at all a painful process. Hansen Grut, on the other hand, gave up epilation, on the ground that it was "abominably painful, and much worse for the patient than the real operation." A personal experiment has inclined me to Hansen Grut's view.

In cleansing the lids, most surgeons are content with a general washing of the skin surface, whilst a few, amongst whom was Panas, lay great stress on paying attention to the free margins, and to that end seize each lid in turn, and rub its edge with cotton wool soaked in some antiseptic solution. Professor Schroeder, of St. Petersburg, uses benzine for this purpose instead of an antiseptic.

TREATMENT OF THE CONJUNCTIVA.

The general consensus of opinion is undoubtedly in favour of cleansing the conjunctiva before operation. To this rule de Wecker is an exception, for, "after having given a prolonged trial to irrigations with aseptic boric solution, he has now renounced them as useless, irritating, and calculated to tediously prolong the operation." If the conjunctiva is healthy, he advises the absence of all interference with its surface; if it is not healthy, I gathered that he would bring it into a healthy state before attacking it. I do not believe that sound surgeons seriously expect to render the membrane *aseptic* before operation; they aim, however, at diminishing the number and perhaps the virulence of the germs present, and there is not the slightest doubt that the great body of opinion amongst ophthalmologists lends no uncertain support to the view that it is more than advisable to give the conjunctiva very careful preliminary attention. Some prefer to make use of aseptic solutions, which act simply mechanically, or which, at the most, add a solvent element to their powers of "sweeping" the *cul-de-sac* clean. Thus Kanochi, of Warsaw, Krukoff, of Moscow, Volckers, of Kiel, and others, are content to use normal saline solution in preference to an antiseptic. Schnabl, of Vienna, uses a 1 per cent. solution of bicarbonate of soda, with a view to dissolve off any adhering coat of mucus in which germs might be lying and multiplying. Landolt trusts to a sterile solution of boric acid, with which he very thoroughly washes out the conjunctival sac. Of the salts of mercury the perchloride, in solutions of various strengths, remains the favourite. Von Michell pours in a $\frac{1}{3000}$ sublimate lotion, and rubs it well into the mucous membrane. Fuchs prefers $\frac{1}{4000}$, but only uses it when the state of the conjunctiva is open to suspicion before operation; otherwise he thinks it better to keep to sterilised normal saline solution. Amongst the advocates of a $\frac{1}{5000}$ solution are to be numbered Sbordone, of Naples, H. R. H. Karl Theodor, of Munich, Haab, of Zurich, Pagenstieher, of Wiesbaden, and Hirschberg and Greef, of Berlin. The two last-named make a great point of freely rubbing the lotion into

[1] *Archives d' Opthalmologie*, January, 1903.

the everted conjunctiva. Lastly, Hansen Grut and Bjerrum, of Copenhagen, use the sublimate solution at a strength of $\frac{1}{8000}$. As to other mercurial solutions, the bicyanide is preferred by Adelheim, of Moscow, by Trousseau, of Paris, and by Rogman, of Ghent, the last named using it at 1 per 1,000. Lapersonne favours the biniodide, whilst Nordensen, of Stockholm, and others advocate the oxycyanide 1 in 2,000. Space would not suffice to describe at length all the varieties of ways in which I have watched the cleansing of the conjunctiva carried out. Some surgeons pour in the solution from a special glass-vessel, others use pressure with an irrigator, and yet others lay the greatest stress on rubbing the antiseptic into the membrane. To accomplish this last-named object, some use cotton sponges, whilst others rub the lids on each other or against the eyeball. My own preference still holds in favour of M'Keown's method of irrigating the conjunctival sac under pressure with a $\frac{1}{3000}$ solution of chinosol in sterilised water. I believe this drug to be a powerful antiseptic, and it is certainly harmless, which is more than I can say of perchloride of mercury. I feel bound to add that several ophthalmologists have told me that they have not shared my experience of the irritating qualities of the sublimate, and Haab assured me that, if one uses Merck's hyd. perchlor. purissimum, one can eliminate this serious disadvantage, which he attributes to impurities in the salt usually supplied. On the other hand, I met not a few who, like myself, had abandoned perchloride, on account of the irritation it sets up.

Seeing the complex composition of chinosol, it goes without saying that fresh solutions must always be used.

TREATMENT OF THE LACHRYMAL PASSAGES.

There is a wide consensus of opinion amongst ophthalmologists on the subject of abstaining from major operations on the globe until after any suppurative affection of the lachrymal passages has been fully dealt with. When we come, on the other hand, to discuss the non-suppurative inflammations of this tract, there is a much greater divergence of opinion expressed. De Wecker goes so far as to imply his scepticism as to the need for careful exclusion of cases suffering from dacryo-cystitis from the cataract-operation table; nevertheless, in practice he is careful to ascertain the condition of the sac and ducts, by inspection and palpation, before he decides to extract an opaque lens. He has nothing but abuse for the method of trial irrigations of the passages, undertaken with a view to test their patency and healthiness or otherwise.

Hansen Grut, Bjerrum, and many other reliable surgeons, share his view that, in the absence of definite signs of disease, it is wise to let the tear-conduits alone.

On the other hand, Völckers, the able and careful Kiel surgeon, whose experience of the operative treatment of the lachrymal sac and duct is probably second to none, lays stress on "diagnostic irrigations" of the passages, which he considers should *never* be omitted. Kanochi, of Warsaw, and Nordensen, of Stockholm, go still farther, and invariably syringe out the lachrymal passages before a major eye-operation, with a view to removing any septic matter they may contain from the neighbourhood of the eye. I think it was Völckers whom I saw carefully empty the sac of its contents by pressure before each cataract extraction; he received any of the contents which might escape upwards on antiseptic wool sponges. In common with not a few other surgeons, Völckers prefers to extirpate the sac before an extraction for cataract, if he considers the passage diseased. Fuchs divides the weight of his advocacy between extirpation of the sac and splitting of its anterior wall. If he adopts the latter procedure, he cleanses the sac wall, and then fills the cavity with iodoform powder. Some operators prefer to temporarily obliterate the puncta lachrymalia a few days before operation, and to restore its patency by a subsequent small operation; Haab is amongst this number, if my memory of what he told me serves me right. For my own part, it appears to me that a small suture applied at the time of operation would easily obliterate the canaliculus, and so save the more extended operative measures above indicated. It could be easily removed after a few days, and should not be more painful than an ordinary skin-suture is. I mean to try it if opportunity offers later on.

PREPARATION OF DROPS (ATROPINE, COCAINE, &C.).

In this, as in other details, there is a considerable difference between the practice of different surgeons. Many have the alkaloids dissolved in antiseptic solutions; thus De Haas uses $\frac{1}{1000}$ perchloride as a vehicle, while others prefer weaker lotions of the same salt. Again, Adelheim, of Moscow, has chosen a $\frac{1}{6000}$ solution of the cyanide of mercury for the purpose, and so on with others. Trousseau uses distilled water as a solvent, whilst others are obliged to rest content with freshly boiled water. A few surgeons join De Wecker in the extravagant practice of receiving their solutions daily or tri-weekly from a chosen chemist who carefully sterilises them in an autoclave. Hirschberg boils all drops, and prepares those for each patient quite separately from those for any other. His dictum is, "For each patient his own drops, and his own dressings." He has small drop-bottles made of a special glass which, he claims, does not admit of chemical change occurring between itself and the alkaloids during ebullition. Much ingenuity has been expended in devising varieties of dropper bottles, in order to combine easy flow with the least chance of contamination. It would serve no useful purpose to enumerate at length the different strengths in which I saw the various alkaloids used, or to give details of the frequency, periodicity, &c., of instillations in vogue in different clinics, but it is of interest to note that with most surgeons cocaine is still the favourite local anæsthetic. Rogman, however, favours tropacocaine, while Hirschberg recommends a mixture of cocaine and holococaine.

(*To be continued.*)

CASES ILLUSTRATIVE OF ELEPHANTIASIS.

By W. Renner, M.D. (Sierra Leone).

Elephantiasis is not a disease which is endemic in the colony proper of Sierra Leone. It is met with in its endemic form in the lower Mendiland of the Protectorate, especially in the Krim and Gallinas country of the Bandajuma district. It affects the male more frequently than the female, and the external genital

organs more often than any other region of the body. It is still rather doubtful whether we could attribute the etiology of this disease solely to the *Filaria diurna*. The Hon. Dr. Prout, Principal Medical Officer of this colony, has expressed his doubt on the subject, as may be gathered from a paper read before the British Medical Association in 1902.

Elephantiasis of the Scrotum.

Case 1.—Mohammed Jureidi, a Foulah from Conakry, aged 20, was admitted into the Colonial Hospital on July 29th. He could not speak the English language, but through an interpreter the following history was obtained from him. He was a cowherd, and was born at the village of Kynsia in French Guinea. He has several brothers and

sisters, none of whom have suffered from the disease. It takes him five days to travel from the coast to his own town. His town is not near any large river or stream; it is lowland, and swampy during the rains. He lived there all his lifetime, except for one year when he went down to Mellicourts to be circumcised, according to native custom. He has suffered from fever. He first noticed his present illness five years ago, and about four years after his circumcision, when his scrotum commenced to swell, and has continued gradually to increase until it reaches down nearly to his knee-joint. The patient on admission was emaciated, and his enormous scrotal tumour was a very great drag upon him. He was placed on generous diet. His blood was repeatedly examined by Dr. Latchmore, of the Princess Christian Cottage Hospital, but no filariæ were found. One or two malarial parasites were noticed on the stained specimens.

On August 15th patient was placed on the operating table. The tumour was first bandaged with Esmarch's elastic band and suspended for two hours. Patient was then placed under chloroform and an elastic tubing of an inch calibre was made to encircle the neck of the tumour in the form of the figure 8 and attached to a bandage round his waist. Patient being under chloroform the tumour was now removed from suspension and elastic band removed.

The penis was quickly disengaged from the mass in which it was embedded and given to the care of an assistant. The testicles were next dealt with, each in its turn, and handed to the assistant. In making the incision for the separation of the testicles a large quantity of serous fluid escaped from the tunica vaginalis. The incision was carried as much as possible into the healthy skin and the great mass was removed, the net weight being 52 lbs.

There was a good deal of bleeding and several arteries were ligatured. The skin-flaps were now brought together with catgut, and there was sufficient skin to cover the testes and penis. The process of healing was most satisfactory, although the patient suffered a good deal from fever, with rise of temperature up to August 23rd, when it became normal. From this date he continued to improve. By September 30th the wound had completely cicatrised and the patient was allowed to move about. His general health had much improved, and he had grown quite stout.

He was discharged from hospital on November 14th, perfectly well and healthy, the penis showing signs of sexual capability.

Case 2.—Patient, Sasa, aged 56, a labourer, was admitted on September 18th. He was born in Sherbro district of the colony of Sierra Leone. He has two brothers and a sister. He speaks the native patois of the English fairly well. The following history was obtained:—

He went to "Bundu" to be circumcised at the age of 14. He noticed his scrotum commenced to swell about four or five years ago, and it seemed to grow larger after each attack of fever, which was accompanied with pain and swelling of the scrotum.

The tumour on examination was found to be an elephantiasis of the scrotum. He was desirous to have it removed.

On October 9th patient was placed under chloroform and the usual procedure before operation was taken. The tumour was removed by Dr. Latchmore, who had sent the patient in, with my assistance. The net weight after removal was 4 lbs.

This patient had a good deal of fever up to the 17th, when the temperature became normal. The wound healed fairly well. The patient was discharged cured on November 13th, the wound having been completely healed. In this case the penis, although affected by

the disease, was not, however, enveloped in the substance of the tumour. His blood was examined by Dr. Latchmore; no filariæ were found.

This patient had also "ichthyosis" of the hands and feet. This condition is met with frequently among the natives of the Hinterland, and in entering into the history of the condition, he states that it is a "family disease." His mother suffered from it on her hands and feet, also his sister. His father and two brothers are quite free, which shows the hereditary condition from the female side.

The natives attribute this condition, however, to a certain peculiar family idiosyncrasy which renders them subject to the disease. If the members of the family had eaten alligators, fowls, tortoise or certain fishes they become subject to the disease, which may run through the family; consequently one meets with natives whose family take the oath not to eat the above-named animals.

Elephantiasis of the Right Leg.

Patient, S. Paris, a native of the Sherbro district, was admitted into hospital on August 15th, emaciated and debilitated with elephantiasis of the right leg and some small foul ulcers of the left leg (*vide* photo). He was placed on generous diet and tonics. His condition quickly improved, and on October 9th he was placed under chloroform and an amputation at the knee-joint (Stephen Smith's) was performed.

Patient's temperature on the next day was 100°, but by October 24th it became normal. From this date his progress has been most satisfactory; his stump has healed very nicely (*vide* photo), and the patient, who is now convalescent, moves with the aid of a crutch.

Several additional photographs sent with this article had evidently faded *en route*, and could not be satisfactorily reproduced.—Ed. *J. T. M.*]

NOTES ON A CASE OF AINHUM IN SOUTH AFRICA.

By John Muir M.D.(Edin.)

This rare and interesting ailment was observed in a Maasa native from Marabastab, Zoutpansberg; in his youth elephant hunter up to the Zambesi; barefooted always. Age 60. Never lived out of South Africa. Began to notice toes getting bad between 1869 and 1870 (*i.e.*, he says, between the Great Basuto War and the opening of the Kimberley Diamond Fields). Came to us April 17, 1900. The affliction began as a groove on the inner border of right little toe, round to plantar surface at level of web. This gradually deepened during subsequent years; being painless at first, but painful later, quite independently of pressure or walking, even aching in bed. This passed off later. By 1893 he was unable to wear shoes, as they hurt him. The groove was now deeper, but no great enlargement of toe. Since 1897 the toe got larger and more troublesome. In February, 1899, it got "very bad" (*banja slecht*); the toe enlarged and hurt him if moved.

Condition on Examination.—A dark, hard, dry, rough, horny everted lump attatched by isthmus $\frac{1}{4}$ in. thick, and sessile. About 1 in. in diameter, and resembling a small potato. A linear sore existed all round the base, which corresponded with the joint. Toe was dangling, and absolutely without feeling. We removed it with thermocautery and dressed the surface, which was quite smooth and rounded, with dermatol and a starch bandage.

On the left foot a similarly situated slight groove, with epithelium thickened, horny and scaly. No groove on dorsum or externally. This linear band has narrowed the base of the toe considerably, which looks dry and scaly all over. No ulcer, even when the dead dry layers of epithelium are removed. Right foot began in the same way. All other toes normal.

Remarks.—Never cut his toes at these spots, nor wore toe rings. He knew a man in the Low Country, also a Maasa, who had a similar disease, whose toe was removed by native doctor with hatchet. Has seen no other case among tribes in Low Country of Transvaal, Mashonaland or Barotseland. Dr. Holzmann and myself concurred in a diagnosis of Ainhum. The Editor of the *South African Medical Journal* in Cape Town had never heard of a similar case. The man is still here. Neither of us have heard of such a disease in South Africa.

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THE

Journal of Tropical Medicine

March 2, 1903.

THE DANGER OF INTRODUCING YELLOW FEVER INTO ASIA WHEN THE PANAMA CANAL IS OPENED.

At the Epidemiological Society on February 25th, Dr. Patrick Manson, C.M.G., F.R.S., LL.D., read a paper on the danger of introducing yellow fever to the Asiatic countries on the Pacific littoral, when the Central American Canal permits of direct steamship traffic between the West Indies and the Asiatic continent.

Dr. Manson pointed out that by this route ships would travel along a track which would be wholly within the tropics, and whilst the temperature would prove favourable to the prevalence of yellow fever during the voyage, it would also not be inimical to the Stegomyia fasciata, the mosquito by which yellow fever is conveyed to man. Recent researches have shown that the Stegomyia is capable of living and of conveying infection for some fifty or sixty days, and as the voyage between Panama and, say, Manila or Hong Kong would occupy not more than thirty days at most, the danger of introducing yellow fever into Asia by this channel is no fanciful theory but a question of practical hygiene. It is needless to point out the magnitude of such a possible calamity, and the urgency of inducing the governments concerned to deal with the question in a practical manner.

Dr. Manson's views were endorsed by Dr. Nuttall, of Cambridge; Dr. Strong, of the United States Laboratories in Manila; Dr. Sambon; Dr G. C. Low, Superintendent of the London School of Tropical Medicine; Dr. Henderson, late of Shanghai; Sir William Kynsey, Professor W. J. Simpson, Inspector-General Turnbull, Sir Francis Lovell, Dr. Fremantle, Dr. Farrar and Mr. Cantlie; and by the unanimous vote of the meeting it was agreed to take steps to bring the matter before the authorities in a practical form. Several of the speakers brought forward incontestible arguments as to the extreme danger likely to accrue from the introduction of yellow fever into the densely populated and insanitary cities of China. That the disease would be limited to the Chinese coast towns there is no probability. The frequent intercourse between China and Japan, between China and the Malay Peninsula, India, and the islands of the Archipelago and Australia, would open up a pathway of infection and the certainty of the prevalence of a scourge which it is fearful to contemplate. Dr. Manson advocated conjoined action by the several countries likely to be affected by this question, and especially recommended the United States and British Governments — the countries chiefly interested—to take steps to grapple with a danger which all are agreed is imminent. Many incontrovertible facts were brought forward by several of the speakers in support of the probability of Dr. Manson's contention, especially by Drs. Nuttall, Strong and Sambon; and it was felt that the matter was one of vital importance to the peoples concerned and to the vast trade interests held by Great Britain in the Far East.

It is interesting also to note that on December 15th, 1902, Dr. J. C. Thomson drew attention to

the danger of the introduction of yellow fever into China. In the course of his remarks in a lecture on the mosquito and malaria, Dr. Thomson said: "What he desired to point out was, that if yellow fever should visit Hong Kong, we have a mosquito swarming in the colony which can cause it to become epidemic. We are apt to think of yellow fever as the scourge of the far-away West Indies and Central America, and not to be reckoned with here." Dr. Thomson then mentioned the forthcoming inauguration of a freight and passenger service between Hong Kong and the Mexican ports; and said that from March 1st Hong Kong will be in direct communication with one of the great endemic centres of yellow fever, and we may any day thereafter have yellow fever landed on our shores. "And we have the appropriate Culex ready to carry it from man to man, a mosquito which from its day-feeding habits is more difficult to reckon with than Anopheles."

Dr. Sambon, in the course of his remarks at the Epidemiological Society's meeting, drew attention to the matter referred to by Dr. Thomson, and it is evident that all thoughtful medical men view with concern the establishment of unrestricted direct communication between Central America and the Far East.

THE SECTION OF TROPICAL DISEASES AT SWANSEA.

We are pleased to inform our readers that the Council of the British Medical Association, at a meeting held on February 25th, decided that a Section of Tropical Diseases is to be held at the meeting in Swansea in the summer.

We hope to announce the officers of the Section in our next issue. We wish the coming meeting all the success which has attended its predecessors.

Correspondence.

To the Editors of the Journal of Tropical Medicine.

Dear Sir,—During my recent visit to Paris I was asked by the Committee of the Tenth International Congress of Ophthalmology to accept office as a Corresponding Member of the Congress, with a view to my obtaining Indian material from European and Native medical men practising in the East. Professor Landolt has now written to me as follows:—

"The Committee desire to add to the interest of the forthcoming meeting by obtaining for exhibition any objects which bear on ophthalmology. Such will be welcome whatever their age, nationality, or nature may be. I am now writing to remind you of your promise to help us, and to ask you to beg our colleagues in India to furnish us with any books, engravings, surgical or optical instruments, &c., &c., which they may be able to find in that country, so full of interest, which has indeed been the cradle of our civilisation. Anything which bears on our art will be welcome. Such objects can be sent either to you, or direct to M. le Dr. Stocker, Medecin-oculiste, Lucerne, Switzerland. The Congress will meet at Lucerne in September, 1904. Each object should bear the name and address of the sender, as well as a note explaining its use, its origin, its age, &c., &c. We will take care that nothing is lost, and in every case that the owner desires us to do so, we will carefully return the object, or objects, to him. Should any of the senders be willing to present the objects to the Museum of Ophthalmology, which we hope to lay the foundation of at this Congress, we will gratefully receive the same. Allow me to express the earnest desire that our colleagues, English and Native, Christian, Mahommedan and Hindu, will receive with favour these requests, which I entrust to you to convey to them, and permit me to remain, &c., &c., &c."

This letter is self-explanatory. I am most anxious to do all in my power to assist the Committee, and would ask medical men in India to send any books, instruments, &c., direct to Dr. Stocker. At the same time, I would myself much like to receive any notes on native methods of practice in ophthalmology, in order that I may be able to incorporate them in a paper I am writing, by request of Prof. Landolt, for the Congress. I need hardly say that all help given me will be fully acknowledged in that paper. Native methods of performing "couching" or other operations are of special interest. As I shall be leaving here in April, my safest address will be, c/o Messrs. Grindley and Co., 55, Parliament Street, London, S.W.

If you will be so good as to publish this letter in the columns of your valuable paper, you will greatly oblige the Committee as well as myself.

Yours truly,
R. H. Elliot,
Capt. I.M.S.

British Medical Association.

TROPICAL OR AMŒBIC ABSCESS OF THE LIVER AND ITS RELATIONSHIP TO AMŒBIC DYSENTERY.

By Leonard Rogers, M.D., M.R.C.P., F.R.C.S., B.S., I.M.S.,
Officiating Professor of Pathology, Medical College, Calcutta.

(*Continued from page* 62.)

Time Relationship of Dysentery to Liver Abscess.

It is frequently stated, in objection to the view that liver abscess is secondary to dysentery, that the bowel complaint may occur simultaneously with, or even later than, the abscess, so that the latter cannot be dependent on the former, but at the most both conditions may be due to a common cause. Here once more mere clinical data alone will not serve to decide the point, as dysentery, especially the amœboid form, may be latent for long periods and then recur, so that a history of dysentery during or after the onset of symptoms of liver abscess by no means precludes the possibility, or even probability, of the bowel disease having also been present in a mild or

latent form before the liver affection declared itself. Turning once more to cases in which both clinical and *post-mortem* data are available in the same cases, I find in my tabulated and *post-mortem* material 40 cases in which the dates of the attack of dysentery and of the onset of the symptoms of liver abscess are recorded, together with *post-mortem* evidence at a later date. In 32 of these, or 80 per cent., the dysenteric attack preceded the first symptoms of liver abscess, fever accompanied by pain in the hepatic region being taken as indicative of the onset of the liver disease. In 6 of these, however, the history of dysentery was upwards of one year before the commencement of the liver symptoms, and exception might be taken to these as being too remote to be causatively associated with the hepatic disease. On examining the *post-mortem* records of these cases, I find that in 3 of them there was evidence *post-mortem* of both old and recent dysentery, and in a fourth of recent dysentery only, in one only old dysenteric lesions were found, while in the sixth no lesions were seen *post-mortem*. We see, then, that in two-thirds of these cases there was *post-mortem* evidence of recent dysentery, which had not given rise to any symptoms sufficiently definite to be remembered by the patient as an attack of dysentery, or in other words, although ulcerations were still present in the large bowel, and had been so for periods varying from two to ten years (if the histories are to be relied on), yet it had remained in a latent condition and produced no marked clinically evident dysentery. Of the remaining cases the dysentery appeared at about the same time as the symptoms of liver disease in 3, or 7·5 per cent., but in all of these there was *post-mortem* evidence of dysenteric ulceration of the bowel, of a date certainly antecedent to the liver abscess symptoms. In the remaining 5 cases, or 12·5 per cent. of the whole, the dysenteric symptoms set in after the symptoms of liver disease, but in three of these again there was *post-mortem* evidence of ulceration of the large bowel of an older date, as well as recent lesions. In the other two there were no lesions found in the large bowel or in any other part of the gastro-intestinal tract, in spite of the clinical evidence of quite recent dysentery, so that the lesions must have healed up, and it is equally possible, and in view of the constancy of previous dysentery in the vast majority of the cases here dealt with, we might almost say probable, that there had been older dysentery, which had healed in a similar manner without leaving evident naked-eye changes.

Taking the whole series, we find a clear history of antecedent dysentery in 32, or 80 per cent. of the cases, while out of the 8 cases in which the dysentery clinically coincided with, or succeeded in time the onset of liver symptoms, there was *post-mortem* evidence of dysenteric ulceration of a date prior to the liver disease in no fewer than 6, or 15 per cent. This leaves only two cases, or 5 per cent., in which there was not evidence either clinical or *post-mortem* of the dysentery having preceded in time the liver abscess, and even in these it is impossible to be certain that it did not do so, while in 95 per cent. positive evidence of preceding dysentery was obtained.

The Type of Dysentery in Liver Abscess Cases.

The variety of dysentery which is associated with the tropical form of liver abscess remains to be considered, my own experience being again first related, and the older *post-mortem* records appealed to for confirmation or otherwise of the conclusions arrived at. Turning once more to Table II., we can note the type of dysentery met with in a series of cases of liver abscess which have been proved to contain amœbæ in their walls. Unfortunately, in two of the earlier cases no microscopical examination of the ulcers for the amœbæ was made, while the same remark applies to No. 13, owing to the case occurring during my temporary absence. This leaves 8 cases in which actual ulceration was found *post-mortem* in which the amœba was sought for, and in each of them this organism was easily found in large numbers in the yellow material in the bases of the ulcers, not infrequently being so numerous as to be seen in every field of the microscope with a $\frac{1}{6}$ in. lens in an active condition. Further, I have only twice met with this form of dysentery *post-mortem* in other than fatal liver abscess cases. In one of these there was a postcolic abscess due to perforation of an amœbic ulcer, and the colon was adherent to the liver, and pus was just beginning to infiltrate the liver substance at that point of contact, forming the earliest stage of a liver abscess. The remaining patient died of phthisis. That this form of dysentery is really quite distinct from the ordinary Indian dysentery will be evident from the fact that an officer of the Indian Medical Service, who had had many years' experience of dysentery in Indian gaols where necropsies are always performed, to whom I recently showed several excellent coloured drawings made from my cases, said that he had never seen that kind of dysenteric ulcer before. He had only just before remarked that liver abscess was so rare in gaol that he did not see how it could be associated with such a common disease as gaol dysentery. Although, then, the number of my own necropsies is not very great in liver abscess cases, yet it very clearly points to the tropical or amœbic liver abscess being associated exclusively with the less common amœbic variety of dysentery, this form being rarely met with apart from liver abscess or other intra-abdominal abscess secondary to amœbic perforation of the large bowel.

On turning to the more extensive older *post-mortem* records for confirmation of this conclusion, much greater difficulties are met with than in merely deciding if dysentery had been present, and its probable date, for even where the descriptions of the lesions found are fairly complete, it is by no means easy to form an accurate mental picture of the condition from a written description of it. Still, my experience of the conditions found in the cases which I have proved to be amœbic by microscopical examination has enabled me to recognise at once in the records of many necropsies on liver abscess cases a faithful description of amœbic dysentery, while contemporaries of Dr. McConnell have informed me that that excellent observer recognised the dysentery associated with liver abscess as being different from the ordinary form

of the disease, although I have not been able to find any description of it by him. On going through the records of 95 cases in which some description of the condition of the large bowel in liver abscess cases was recorded I was able to recognise 50 of them as accurate descriptions of the conditions I have met with in true amœbic dysentery, that is, in a little over one half of the cases. In 19 more I noted as being "probably amœbic," making a total of 72·5 per cent. as pretty certainly or probably of this type. In 23 I was unable to form any opinion and entered them as doubtful, while in 3 only the conditions described appeared to me to more closely resemble the ordinary type than the amœbic variety, although they were not incompatible with the very catholic description of amœbic dysentery by Lafleur. Allowing for the great difficulty in arriving at a correct and unbiassed opinion from the data dealt with, I still think that these figures strongly confirm the conclusions derived from the smaller number of carefully observed cases recorded in Table II., especially when we bear in mind the rarity with which the amœbic form of dysentery has as yet been met with in India, apart from tropical liver abscess, the only possible conclusion appears to me to be that the form of dysentery associated with, and as we have already seen nearly, if not quite, invariably preceding the amœbic form of liver abscess is the variety produced by the amœba dysenterica.

In support of this view I may also mention that in 17 cases of multiple small pyæmic abscesses of the liver without any large abscesses of which I have been able to examine the *post-mortem* records, in no fewer than 14 the dysentery was clearly of the ordinary catarrhal as opposed to the amœbic variety; in 2 no definite opinion could be formed, while in 1 the condition described appeared to be possibly of the amœbic variety. The multiple small pyæmic liver abscess, then, is associated with severe forms of ordinary dysentery, and in nearly all of these cases in which clinical records are also available I find the patients were admitted and treated for dysentery, and the pyæmic abscesses of the liver were not diagnosed, although in one or two cases some tenderness in the hepatic region was noted. On the other hand, in the "tropical" or amœbic abscess cases the patients are clinically diagnosed as liver abscess in the vast majority of the cases, and are comparatively rarely admitted for dysentery. In other words, liver abscess as recognised and treated clinically in the tropics is in the vast majority of cases of the tropical or amœbic variety, and is preceded in a very large percentage of the cases by dysentery of the amœbic type.

The Seasonal Incidence of Liver Abscess in Relation to the Type of Dysentery.

The month of admission for liver abscess has been worked out from 236 cases in order to see what is the seasonal variation of the disease. Arranging the figures in quarterly periods we arrive at the following results: In the first quarter of the year, January to March, there were 59 cases; in the second quarter, from April to June, there were 58; in the third, from July to September, there were 58; and in the last quarter, from October to December, there were 61. These figures show that there is no season of special prevalence of the disease—a fact which is of great interest in relation to the kind of dysentery which is associated with liver abscess, as it is in entire agreement with the conclusion that this form is the amœbic one, for owing to the chronicity and frequent latency of amœbic dysentery, and the way in which it relapses again and again through several years, there is no definite seasonal prevalence of the disease. On the other hand, the ordinary catarrhal or membranous dysentery has a most definite seasonal incidence, which is usually coincident with that of malaria, reaching its maximum during and after the rainy season, so that if liver abscess was associated with this form of the disease it should also have a seasonal incidence closely following that of catarrhal dysentery, which we see is not the case. It is also of interest to note in this connexion that multiple pyæmic abscesses following severe sloughing, catarrhal dysentery most frequently occurred in the latter half of the year, which is the season of greatest prevalence of the ordinary form of dysentery, while nearly half of them occurred in August and September, when the dysentery season is at its height, thus confirming the relationship of the multiple small pyæmic liver abscess with the common catarrhal form of dysentery.

Other Etiological Factors.

There is a very general belief that alcohol plays a very important part in the etiology of liver abscess, and this opinion is borne out by the fact that in more than half the cases in my tables in which this point was noticed, a history of alcoholism was obtained, although it is not easy to say whether actual excess or only very moderate amounts are indicated in some of the notes. Alcohol, then, appears to be an important predisposing cause of the disease. On the other hand, I have not been able to find any evidence of malaria predisposing to the disease, for although a previous history of so-called malarial fever is often noted, this is usually but the intermittent fever of hepatitis. The *post-mortem* records show that the spleen is seldom enlarged or pigmented in tropical liver abscess, not oftener than in those dying of other non-malarious disease in Lower Bengal.

Amœbic Dysentery.

It is beyond the scope of the present paper to describe in detail the lesions produced by amœbic dysentery as seen in India. The main naked-eye features of the disease may, however, be briefly mentioned. Writing with five coloured drawings made from my cases before me, one is struck by the difference in appearance between the very large ulcers, several square inches in extent, with yellowish white sloughy surfaces, which are met with exclusively in some cases, and the small ones which alone are found in others, which in one case were little larger than a big pin's head. Every degree of these changes however, is shown in the coloured drawing [exhibited], taken from a case of very large single abscess of the liver in a European patient. The cæcum and ascending colon are covered with raised yellowish white sloughy gelatinous material forming very extensive ulcers, with only small areas of healthy mucous membrane between them. The unaffected portions are bounded by well-marked raised borders of the ulcerated

patches, and a thin dark purple line of intense congestion is seen at their boundaries. Thus the ulcers form the raised thickened patches, and the healthy mucous membrane between is of normal thickness, appearing to be depressed below the level of the diseased portions. This, which is just the opposite of the condition met with in the ordinary form of dysentery, is to my mind the most characteristic feature of the amœbic dysentery. The lowest of the large ulcers shows very well the clear line of demarcation between the healthy and diseased portions of the mucous membrane with its thin purple congested zone. Below this will be seen the smaller form of ulcer, which is that most frequently met with in these cases in my experience. The larger of these are of an oval shape extended across the long axis of the bowel, and usually placed on the summits of folds of the mucous membrane in the form of raised patches with a well-defined margin, often showing a ring of congestion, and with a pale yellow surface constituted by the gelatinous infiltration of the submucous coat appearing in the centre of the ulcer on account of the mucous membrane having become detached. The smaller of these are rounded in form, and have thickened edges formed by the mucous membrane being raised by the infiltration beneath it, this material again appearing as pale yellow purulent matter in the centre of the ulcer, the whole being usually surrounded by a distinct narrow zone of congestion. These ulcers may be very few in number, or they may be scattered over the surface of the greater length of the large bowel. Between the small raised patches and ulceration the unaffected mucous membrane appears to be quite healthy, or only shows slight congestion, and, except in very chronic cases, there is no general thickening of the whole of the mucous membrane of the bowel, which is so characteristic of the ordinary catarrhal form of dysentery, and this no doubt accounts for the frequent absence of tenesmus and the common latency and entire absence of dysenteric symptoms in the amœbic disease.

Lastly, the ulcers may be very small, appearing as red dots, in the centre of which, on close observation, a minute pale-yellow superficial ulceration can be detected, surrounded by a red ring of congestion. Such are the general characters of amœbic ulcers of the large intestine, but in some cases a few of the ulcers may show excavation due to loss or separation of the yellow material, and may then present a somewhat greyish appearance. Others may show a shallow excavated surface with a hard slightly raised border, these being in the stage of slightly slow healing. In some very chronic cases all that will be found may be narrow oval or slit-like depressions, with very thick slightly raised overhanging borders with none of the characteristic yellow matter, and with very hard fibrous bases, evidently chronic half-healed ulcers, but even in this stage amœbæ may be found in the floors of the ulcers, as in Case 2 of Table II.

The distribution of the disease in the large bowel is also of great importance, for in my experience, in all cases where more than a few small ulcers are present, the cæcum is most markedly affected, and next to it the ascending colon suffers most, the disease being frequently nearly or quite limited to these parts of the large bowel, especially in those cases where no symptoms of dysentery have been present during life. The largest form of ulcer is commonly limited to the cæcum or to this and the ascending colon, while the smaller ones frequently extend considerably lower down, but do not as a rule affect the sigmoid flexure or rectum. This distribution of the ulcers, together with the absence of thickening or inflammatory changes between the ulcers, constitutes the most characteristic features in which amœbic dysentery differs from the ordinary catarrhal or membranous form of the disease. Lastly, the amœba dysenterica is very easily found in the floors of the ulcers, the yellow infiltration often showing numerous active amœbæ in every field of the microscope.

It should also have been mentioned that although the cæcum is so markedly affected, the disease is strictly limited by the ileo-cæcal valve, and does not invade the lower few inches of the small intestine, as is so often seen in catarrhal dysentery. Chronic peritonitis is not infrequently associated with amœbic dysentery, while the large bowel, and especially the hepatic flexure of the colon, is often adherent to the liver. In one case the large loop of the small intestine was strangulated by a band resulting from such chronic peritonitis, and in the same case a liver abscess opening into the stomach was found containing amœbæ. Quite recently a case of acute peritonitis due to perforation of an amœboid ulcer of the vermiform appendix has been met with, a very large single liver abscess being also present, the amœbæ were found in the liver abscess wall in the perforated ulcer, and in both the large and small ulcers in the large intestine.

This tendency to the production of chronic peritonitis and adhesions is a marked feature of amœbic dysentery, and is produced by a spread of the disease process through the wall of the bowel, without, as a rule, any actual perforation taking place. This feature of the disease is of great importance in connection with the mode of production of the single large abscess in the liver following amœbic dysentery, for it is scarcely possible to explain this by the passage of the amœbæ through the portal vein, for such a mode of infection would surely produce multiple abscesses in the vast majority of the cases, instead of the opposite being the case. Lafleur has recorded the fact that the amœba dysenterica has been found in the peritoneal cavity without any actual perforation of the bowel; and when we remember the way in which an amœbic abscess of the liver will burrow through the diaphragm into the lung or pericardium, it is not surprising that it may pass through the wall of the large bowel. Once in the peritoneum, the circulation within this cavity would tend to carry it slowly but surely towards the large lymphatics under the diaphragm, and being stopped here by the suspensory ligament of the liver, it might work its way into the organ at this point, thus accounting for this place being the commonest seat of single liver abscess. I have been struck by the fact that even comparatively small amœbic abscesses are nearly always situated just under the surface of the organ, and are rarely deep in the substance at all points of their circumference—a fact which is easily explained on this supposition. The frequency with which the ascending colon and hepatic flexure shows marked amœbic

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ulceration may also account for the disproportionate affection of the neighbouring right lobe of the liver, even allowing for its greater size. In this way the frequency with which perihepatic abscess was associated with amœbic dysentery in the Calcutta *post-mortem* records is also easily explained, this form of the disease being generally of the same nature as the amœbic abscess of the liver. while both conditions were met with together in several cases of great interest, a point which space does not permit of elaboration here.

The Value of Leucocytosis in the Diagnosis of Liver Abscess.

I have elsewhere[4] dealt with this point, but as it is completely overlooked in some otherwise excellent accounts of liver abscess, while attention to it will save many serious mistakes, I wish to give one more recent example of its value. A brief experience of tropical work will suffice to teach the difficulty of diagnosis between intermittent malarial fevers and the intermittent fever which is the usual precursor of liver abscess; many a man who has been sent on a sea voyage for the treatment of the former having developed the latter condition. Recently I was asked to examine the blood of a patient who was being treated for malaria, the parasites having been thought to have been detected in his blood. The first glance at the edge of my stained slide showed a great excess of leucocytes, about 90 per cent. of which proved to be polynuclears, leucocytosis being evidently present, a supposition which was confirmed by a count on the following morning. At this time quinine was being given in full doses hypodermically, but the fever was getting higher, and had become of a remittent type. It was now found that he had suffered from pain over the liver and in the right shoulder. However, he was sent on a voyage to Colombo a few days later, my opinion that the case was one of liver abscess and not malaria not having been accepted. At Colombo a liver abscess was opened. The reverse of this happened in another case of fever with signs of hepatitis, in which I was asked to examine for leucocytes. I found them decreased to 2,250 per c. mm., 21 per cent. of which were large mononuclears, these changes being characteristic of malaria, as I have shown elsewhere.[5] A further search revealed malignant tertian parasites. In my experience leucocytosis is most marked in comparatively small deeply-seated abscesses of the liver, in which 30,000 to 40,000 white corpuscles per c. mm. may be found, and less in those which are already beginning to come to the surface, or are forming bulging swellings, probably due to the lower tension in there, as is so often the case with natives when first admitted. That is, this change is most marked just in those cases where the diagnosis is most difficult, and in which leucocytosis will exclude malarial fever. In one recent case, which proved to be a very large single liver abscess, only 8,625 leucocytes were found per c. mm., but the red only numbered 2,860,000, so that the proportion of white to red was 1 to 332, or twice the normal, and that is the lowest count I have yet met with in liver abscess cases.

[4] *Proceedings* of the Nagpore Malarial Conference.
[5] *British Medical Journal*, 1902, i., p. 827.

The Action of Quinine on Amœba and its Bearing on the Treatment of Liver Abscess.

Finally, I come to the practical application of the conclusion that "tropical liver abscess" is produced solely by the amœba dysenterica. Lafleur states that quinine in a solution of 1 in 5,000 will kill this organism, and injections of the drug are used in the treatment of amœbic dysentery. This suggested to me that cases in which thick liver abscess pus swarming with living amœbæ continued to be discharged for ten days after the abscess had been opened, evidently owing to continued breaking down of the liver substance, might be benefited by washing out the cavity with quinine solutions. Such a case was 14 of Table I., in which on the ninth day after the abscess had been opened and efficiently drained, there was thick discharge swarming with amœbæ, together with fever and continued loss of strength. I suggested washing out the abscess cavity with a 1 in 500 solution of quinine, with the result that in two or three days the thick discharge was replaced by a thin, almost serous, one, and the patient began to improve from that time, and made a good recovery. A very similar result was obtained in Case 2, Table I., in which the injections were commenced on the eighth day after opening, the discharge being then still thick and copious, and within two days it had become much less, and subsequent progress was very favourable. This treatment is only of use as long as amœbæ are present in the discharge.

Experiments were then carried out to ascertain what strength of quinine is required to kill the amœbæ found in liver abscess cases, those from several different cases being used, scrapings from the abscess wall obtained either during life or *post mortem*, being mixed with quinine in normal saline solution, both the neutral soluble bi-sulphate and the ordinary sulphate (1 grain to 1 minim of dilute hydrochloric acid) being tested, controls of the pus diluted equally with normal saline solution being always used. As the temperature of the laboratory during these experiments was over 90°F., the use of a warm stage was unnecessary. Without giving all the details of the experiment it may be said that 1 in 1,000 quinine solution (both soluble and insoluble salts) failed to destroy the amœba even after several hours' contact, having apparently little more effect than normal saline solution. On the other hand, 1 in 500 solutions stopped all movement of the amœba in from five to fifteen minutes as a rule, a temporary stimulating effect being sometimes first observed. In order to test if such a strength would be effective when applied to the wall of a living abscess, a piece of such a tissue, which was full of active amœbæ, was placed in a solution of 1 in 500 sulphate of quinine in normal salt solution, and scrapings examined every five minutes. In none of them were any living amœbæ found. In another trial some of the amœbæ in a thick abscess wall survived the action of a 1 in 500 quinine in normal saline solution for one hour, but were destroyed and rendered granular by a 1 in 100 solution in five minutes, while this last strength in

distilled water killed them at once. A 1 per cent. solution, then, appears to be an efficient destructive agent of the amœba in the wall of a liver abscess, although an even stronger solution might be advisable on account of the difficulty of its diffusion through the very tenacious pus of a liver abscess.

But if such a solution of quinine will destroy the amœba in the wall of an abscess which has been opened when the cavity is merely washed out with it, and the fluid allowed to run out again, will it not have a still more marked action if injected into the cavity of the abscess after as much as possible of the pus has been removed by aspiration, and left there to saturate the wall in which the amœba is found in its active condition? Such a line of treatment appears to me to be the logical outcome of the proof that the amœba is the sole, constantly met with organism in tropical liver abscess, and without fully elaborating the argument here the following facts may be urged in support of this suggestion. In the first place it is well known that this form of abscess of the liver is not very infrequently cured by one or more aspirations without being opened at all, several such cases having occurred at the Medical College Hospital, Calcutta, during the last few years, while a number could be collected from the pages of the *Indian Medical Gazette* and other journals. Further, it is also a fact that these abscesses may become encysted and dried up to a caseous or putty-like mass without any treatment at all, and this is a less uncommon event than might be thought, for I have come across 8 such cases in the Calcutta *post-mortem* records, in 1 of which there was also a recent abscess as well.

Although such cases occur, still in the great majority of liver abscesses only temporary benefit is obtained from a simple aspiration, and on being subsequently opened active amœbæ are found, which account for the recurrence of the pus formation, for we have seen that in the great majority of freshly-opened abscesses no staphylococci are found. If, then, the great bulk of the pus is removed by aspiration and the amœbæ are killed by an injection of quinine solution, why should not some at least of these abscesses encyst or become absorbed, as occasionally occurs in the natural course of the disease, and more frequently still after the simple removal of the pus by aspiration? This would especially apply to the smaller and deeply-seated abscesses, which are just those in which aspiration has to be performed for the purpose of diagnosing and locating the disease before any operation for opening them is undertaken. Why should not the quinine solution be injected at this time, the pus which has been removed being examined by the microscope and cultures for pus-forming cocci, and if these are absent the case might safely be watched for a time to see if the abscess will subside after the quinine injection? The dose might be 30 gr. or more of quinine dissolved in from 2 oz. to 5 oz. of water and sterilised; the lesser quantity being used in small abscesses containing only about 10 oz. of pus, and the full amount in larger ones, so as to bring as concentrated a solution into contact with the collapsed abscess wall as the limited dose will allow of, and at the same time permit sufficient of the solution being used to saturate the whole extent of the wall of the cavity. The ordinary insoluble sulphate (1 gr. to 1 minim of acid sulph. dil.) would probably be best as being less likely to be rapidly absorbed from the cavity, although I do not think there is much likelihood of this interfering materially with the effect of the solution, on account of the very densely fibrous nature of the walls of most of these abscesses; 30 gr. of quinine in 5 oz of water will make a strength of 1 in 80, which is more than that required to kill the amœba quickly, while if a 30 gr. dose be used in 2 oz. or 3 oz. a still stronger solution can be injected. This method is about to be tried in Calcutta, and I hope before long to be able to report on it.

Conclusions.

(1) The amœba is constantly found in an active condition in the wall of tropical abscess of the liver, although frequently absent from the pus in its cavity. The amœba is the only organism constantly found in such abscesses.

(2) Staphylococci and other pyogenic bacteria are absent from the pus in the great majority of cases when the abscess is first opened.

(3) In cases of which a complete record is available there is either a history of dysentery or lesions of this disease are found *post mortem* in over 90 per cent. of the cases, and it cannot be certainly excluded in the remainder.

(4) The dysentery precedes the liver abscess or lesions in the large bowel of an antecedent date and are found *post mortem* in 95 per cent, of the cases.

(5) The form of bowel disease associated with the large tropical or amœbic abscess of the liver is amœbic dysentery.

(6) Severe sloughing forms of catarrhal dysentery may be associated with small multiple pyæmic abscesses, which is a totally distinct condition from tropical or amœbic abscess, and is very rarely recognised during life.

(7) Quinine solutions rapidly destroy the amœba, and may be used with advantage in washing out liver abscesses after they have been opened. They are also worthy of a trial, as injections after aspiration of the pus as a possible curative measure, especially in such cases as are found to be free from the ordinary pyogenic organisms.

Notices.

Pure All-malt Whisky.

The subject of the purity of whisky is occupying considerable attention just now in the medical and the lay press. We have been favoured with a sample of "Throgmorton All-malt Scotch Whisky," by the managing director of the well-known firm of Messrs. J. Lyons & Co., Limited, and we have been asked to pronounce an opinion upon its quality.

The whisky is excellent. Having said so much, it is useless to go further, and to attempt by chemical analysis to prove its purity, &c. Whisky that requires chemical analysis to help its sale is but poor stuff.

Let the analytical chemist confess, once for all, that it is absolutely beyond the power of chemistry to determine the value of a spirit. No known method of analysis can determine the age, the quality, nor the probable physiological effects of any sample of whisky, and it is time that this fact was understood and publicly stated. The tea-taster is not beholden to chemical research to determine the quality of a given tea, and still less so is this possible with regard to spirits. The flavour, aroma, taste, and the effects of a particular spirit are the only factors by which its value can be determined, and these are beyond the power of any laboratory investigation to ascertain. It is plain, therefore, we are in the hands of the producer, the distiller and the salesman—the spirit merchant; so that the only guarantee of the purity, age, &c., of a whisky is the honesty of the distiller and the merchant. It is only some thirty years since whisky became a favourite drink outside Scotland and the north of Ireland. In our Colonies and in India brandy was the usual beverage; but the quality of the brandy, owing to the excessive demand, became so bad that whisky—and especially Scotch whisky—supplanted it. Now, after thirty years, history seems about to repeat itself; whisky has become so popular a beverage, especially amongst Europeans in warm climates, that the production of whisky (old whisky, at any rate) is not commensurate with the demand, and in consequence brandy threatens to supplant its rival. The demand for Scotch whisky became so great in the 'eighties, that the unscrupulous chemist was tempted to produce "a whisky" which "had never seen the malt;" and a spurious concoction, made from any substance that yielded spirit on fermentation, in however poisonous a form, found its way into the drink traffic.

We remember seeing in Hong Kong, during a lecture on alcohol by the Government analyst, a bottle labelled thus: "Fine Old Highland Whisky made in Germany." This poisonous fluid was being sold there at 1 dollar 25 cents (about two shillings and sixpence) a case (12 bottles). This poison was served chiefly to soldiers and sailors, and its forensic (not necessarily intoxicant) effects were all too apparent when the sailor or soldier left the public-house for the street.

It is time legislation protected us from the products of modern chemistry in many articles of food and drink which are admitted to our markets. Chemistry has no doubt a useful place in checking adulteration; but the chief aim of many chemists, more especially in Germany, seems to be to produce imitation articles of spurious value, and with deleterious effects upon the public health. We specially mention Germany in this *rôle*, for we cannot forget that not so many years ago a Hamburg wine merchant confessed that there were, at the time he gave his evidence, 3,000,000 bottles of "hock" in England "that had never seen the grape."

How, then, are we to be protected? In the first place, let us get rid of the belief that the chemist can help us in the matter, and a great step will be taken. Let us also get rid of the "blender" and his handiwork; a blended whisky should be looked upon as an adulteration. It has been blended to hide rawness, newness, faulty aromas, or other shortcomings. No pure matured malt whisky needs blending. What is wanted is a pure all-malt whisky, kept until it is matured, and removed from any possibility of being tampered with. For these conditions we are wholly dependent upon the honesty of the distiller and the merchant. Given honesty in trade, whisky will maintain its usefulness in sickness and its place as a beverage. We are in the hands of the merchant, and therefore we are pleased to see that a firm of such standing as Messrs. J. Lyons & Co. Ltd., are taking up the matter of pure all-malt whisky. We feel sure that the public will unreservedly accept their statements as to the age, the genuineness, and the purity of the whisky they issue. Since the chemist cannot tell us whether the sample submitted to him is old Glenlivet whisky from the Minmore Distillery itself, or "Fine old Highland Whisky made in Germany," we have to rely upon the honesty of the producer and the salesman, and, fortunately, we have yet in this country both producers and salesmen "who can neither be bought nor sold."

Notes and News.

New Cure for Malaria.—A daily contemporary informs us that Dr. Dempwolff, who succeeded Professor Koch as head of the German Expedition for the prevention of malaria in German New Guinea, states that he has discovered the existence of an aquatic insect which destroys the Anopheles mosquito. He proposes to cultivate these useful insects by artificial means, and in this way hopes to exterminate the malaria mosquito.

Instructing the Public on the Malaria-Mosquito Question.—We are glad to see members of the medical profession devoting themselves to the instruction of the public on the subject of malaria. Dr. J. C. Thomson, on December 15, 1902, delivered an able and instructive address before the Odd Volumes Society of Hong Kong, on the subject of "Malaria and its relation to the Mosquito." His Excellency the Governor, Sir Henry A. Blake, G.C.M.G., occupied the chair, and the audience included the leading members of the community. Dr. Thomson remarked that "he believes that malaria would entirely and finally disappear if any one of three measures could be efficiently carried into effect:—(1) If the blood of all malarious persons could be disinfected, say, by quinine; (2) if all healthy mosquitoes could be prevented from biting infected persons, or if infected mosquitoes could be prevented from biting healthy persons; (3) if all Anopheles mosquitoes could be destroyed. Unfortunately, he admitted, no one of the three is capable of universal application; and it remains in any given locality to apply such of the general principles stated as may seem most likely to reduce malaria to a minimum, or cause its entire disappearance in that locality."

We hope to see medical men following the good example set by Dr. Thomson, and we shall be glad to know that in all our colonies public instruction of the kind is being given. Medical officers in Lagos, West Africa, were the first to take up the systematic teach-

ing of this subject, under the auspices of Sir Wm. McGregor. We published several of these lectures, and we shall be glad, should spare permit, to reprint Dr. Thomson's able lecture, so that other medical men may have a type on which to base their teaching.

Current Literature.

PLAGUE.

PREVALENCE OF THE DISEASE.

INDIA.—During the weeks ending January 3, 10, 17, 24, and 31, the deaths from plague in India numbered 15,827, 15,683, 16,197, 19,224, 22,954, and 24,500 respectively. An alarming increase of plague has occurred in Poona, and in most places along the G.I.P. line of railway plague prevails.

EGYPT.—A few cases of plague were reported in Egypt during January and the early part of February in the village of Barsshouni-el-Koubra, in the district of Toukh, Galioubieh province. The Director General Sanitary Department, however, reports that during the week ending February 15, neither cases nor deaths from the disease occurred.

SOUTH AFRICA.—In Cape Colony during January but one case of plague was reported from Port Elizabeth, none other from any part of the colony. In Natal plague prevailed in Durban during January and February. The latest report, dated February 23, is: The plague here is abating. There are now 16 cases under treatment, including two Europeans. Since the beginning of the outbreak seven Europeans, 33 natives, and 43 Indians have been attacked. There have been 50 deaths, two of Europeans.

MAURITIUS.—During the weeks ending January 22, 29, and February 5, 12, and 19, the fresh cases of plague in Mauritius numbered 8, 0, 5, 4 and 4 respectively, and the deaths from the disease, 4, 5, 4, 1 and 1 respectively.

HONG KONG.—During the weeks ending February 7, 14, and 21, the deaths from plague in Hong Kong numbered 12, 2 and 3 respectively.

JAPAN.—During the second week of January plague appeared in Tokio. The disease was confined to a small area of the city. Up to January 20, 11 cases of plague were reported with 9 deaths from the disease, but on this date the outbreak was reported to have been checked.

MAJORCA.—An Italian barque arrived at Palma, Majorca on February 17, from the United States of America with several (supposed) cases of plague on board.

CHOLERA.

EGYPT.—Since January 18 no cases of cholera have been reported from Egypt.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

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2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—MARCH 16TH, 1903.

Original Communications.

TRYPANOSOMIASIS ON THE CONGO.

By Dr. PATRICK MANSON, C.M.G., F.R.S.

THE publication of the case of trypanosomiasis alluded to in your columns some months ago, and which is at present under my care in the wards attached to the Tropical School at the Albert Docks, has been delayed intentionally, pending developments. Meanwhile I have received information about a similar case, also a lady, and whose infection was also acquired on the Congo. As this second Congo case presents several features of a suggestive character, both as regards the manner in which the infection was acquired and also as regards the symptomatology, I have thought it well to bring it forward, although the information about it is very incomplete, in the hope that by calling attention to the points I refer to further information bearing upon them may be elicited.

On July 17th, 1901, a lady, aged 40, consulted me about a fever from which she had been suffering from time to time, and which was invariably preceded and accompanied by an erythematous rash on the face and trunk. The fever, she informed me, recurred with regularity about once in ten days; each attack lasted three days, and was followed by seven days of complete apyrexia. Rigor was not a prominent symptom. The erythema occurred in spots and patches varying in size from an inch in diameter to a patch a foot across. Usually they presented a ringed appearance. The erythema subsided with the temperature.

The patient informed me that she had resided for two terms, of two years and one year respectively, on the Congo. It was during the last of these that the disease developed. Both she and her husband dated her illness from the middle of 1900, and attributed it to a bite on the foot. What inflicted the bite they did not know, but believed that it was an insect. The foot swelled and must have given considerable trouble, for "boracic lotions were used to take down the swelling." Two or three days after being bitten she sickened with what her husband described as a "big fever" of two months' duration, temperature not reaching the absolute normal for quite three months. Erythema was a feature of the fever from the commencement. Being pregnant at the time, she left the Congo for England. Throughout the voyage she suffered from fever. She arrived in England in April, 1901. A week later she was confined prematurely of an eight months' child. Ever since the confinement until the time I saw her in July she had had these attacks of fever and erythema about once in ten days. There had been a good deal of rheumatic-like pain in wrists, knees and ankles, partially relieved by salicylates, which she said caused profuse sweating. She complained of weakness of vision, which I attributed to asthenopia from general debility.

On examination I found the patient to be somewhat anæmic, but I detected no visceral disease; the spleen and liver were not noticeably enlarged. Unfortunately, from want of leisure, I made no blood examination.

I again saw the patient in April, 1902. Meanwhile she had consulted an eminent dermatologist who suggested that the erythema from which she continued to suffer might be a toxic eruption due to the quinine she had been taking more or less systematically. The quinine was accordingly suspended. She informed me that her general health had improved since her previous visit, notwithstanding the fatigue and anxiety of nursing her baby who had been very delicate and who had died some eight months after its birth. She certainly looked better. The fever had been in abeyance for a considerable period until about three weeks before this her final visit to me. During these three weeks, and apparently in consequence of a cold, she had had three slight attacks; these were, as usual, associated with erythema, though the eruption was distinctly less pronounced than formerly.

Some three months later this lady and her husband returned to the Congo. I heard no more about her till lately, when I received letters from her husband and from Dr. Sims, of Leopoldville, announcing that Dr. Broeden, of the Leopoldville Bacteriological Institute, had found a trypanosoma in her blood. I gather from Dr. Sims letter that reading of the cases of trypanosomiasis recently described, he had been led to suspect the nature of this lady's illness and had got Dr. Broeden to examine the blood. Her husband writes: "Her general health is now really good and she is much stronger than when in England; the fevers do not pull her down. Her eyesight, which had been affected, is now restored. She has had fevers for nearly five months every ten days; as soon as the fevers are over she is perfectly well; they are very slight. The fevers do not seem to be as trying as ordinary malarial fevers, especially those she is having now."

Additional Cases of Trypanosomiasis on the Congo.

Dr. Sims informs me that Dr. Broeden subsequently found another case of trypanosomiasis in an official whose blood swarmed with the parasites; and he mentions a third case in which the patient went mad, and in whom, judging from the clinical symptoms, presumably fever and erythema, he surmised that the trypanosoma was present.

Thus within a few months we hear of no fewer than four cases of trypanosomiasis in the very limited European community on the Congo. From this we are driven to infer that trypanosomiasis must be alarmingly common in that part of Africa.

Remarks.—(1) The patient and her husband associated her illness with the bite on the foot two and a half years ago, and which was followed within two or three days by a severe continued fever of several months' duration. We have exactly the same history in the case of the other poor lady at present in the Seamen's Hospital suffering from advanced trypanosomiasis, namely, a sore on the leg, attributed to insect bite, and followed by a three months' fever—the initial fever which issued in a more chronic recurring intermittent fever.

The same sequence of events in the two cases strongly suggests that the virus in both instances was introduced by a bite. It would therefore be of great practical importance to ascertain what the animal that inflicted the bite may be. The thought occurs to me that this may be the poisonous tick of bug-like habits (*Argas moubata*) that Livingstone and afterwards Sir John Kirk and others have described as occurring at Tete and other places in the Zambesi valley. I take the liberty of transcribing a page from the forthcoming edition of my manual of tropical diseases referring to this animal and its effects. The information is somewhat hazy, but it may be of assistance to any one having the opportunity to clear up what seems to me to be a cardinal and very important point in the etiology of trypanosomiasis.

Ornithodorus moubata (*Argas moubata*, Murray).

Dr. Livingstone was the first to describe the tick disease of Portuguese South Africa. He met with it at Ambaca and Tete on the Zambesi. He says: "The effects of the bite are a tingling sensation of mingled pain and itching, which gradually ascends the limb until it reaches the abdomen, where it soon causes violent vomiting and purging. When these effects do not follow, as we found afterwards at Tete, fever sets in; and I was assured by intelligent Portuguese there that death has sometimes resulted from this fever."

Later, Sir John Kirk referred to the same disease, which he found in the Zambesi valley as high up as Sescheke, above Victoria Falls. "The symptoms," he says, "appear soon after the bite, and are sharp fever, vomiting and often delirium; in about two days these pass off, but there is no marked profuse perspiration as in malarial fever. After recovery the patient has complete immunity from further attacks however he may be bitten, but it is doubtful whether this immunity lasts for any length of time in case of removal."

Dr. Dowson, R.N., in a letter accompanying specimens of the tick sent to the British Museum, says: "The Portuguese believe that the severity of the subsequent symptoms depends on the number of bites received. Severe fever and dysentery, with great swellings around the anus, are stated to have occurred. . . . A Dutch trader assured me that he was bitten by one of these *acari* on the toe, and that the bite was very painful. A few hours later he was seized with most violent abdominal pain, vomiting and purging. The stools contained blood. He was ill for three days afterwards, but said there was no fever at all."

Dr. Daniels, writing to me from British Central Africa, says: "I have come across tick fever. Usually several ticks must bite; they produce a small lump, which remains for two or three days. In from five to ten days the subject of the bites gets an attack of abdominal pain with vomiting and purging. The stools are somewhat dysenteric. This lasts for nearly a week, and is accompanied by fever and rigors. After that, fever continues often for three or four weeks. Some people are not susceptible; others get only one attack; a few may have several, but in time they also become immune. The case I saw, an adult, was in the second week of the illness, and the purging had stopped. The temperature ranged from 100° F. to 102·3°F. Three blood examinations were negative. There were no physical signs."

In Tete the tick is called *Kufu* or *Bu* by the natives, *Tampan* or *Garrapato* by the Portuguese.

Mr. Pocock, the distinguished arachnologist of the British Museum, considers the Tete tick to be identical with *Ornithodorus moubata* found by Welwitsch in Angola. It has been confounded with *O. Savignyi* of Egypt, Somaliland and British East Africa, but it differs from this allied but non-pathogenic species in several minute anatomical details.

O. moubata extends across Africa along the Zambesi valley and its tributaries. In habit it resembles the common bed bug; it inhabits old houses, hiding during the day in cracks and moving about actively during the night in search of the blood of man or beast. In some districts the natives protect themselves from the pest by plastering the walls and floors of their huts with mud and cow-dung; a practice adopted by the Boers, the Bechuanas and nearly all the cow-keeping native tribes. They frequently smoke their huts to drive the ticks from their lodgment in the thatch. The Portuguese at Tete have a great dread of the Garrapato, and always warn new arrivals not to place their beds on the ground, and to be careful to have the inside of their mosquito nets carefully searched for the tick before retiring for the night.

(2) The patient complained at one time of defective vision. I made no detailed examination of the fundus, nor am I aware that she was seen by an expert ophthalmologist.

Curiously enough, our patient at the Seamen's Hospital has a peculiar condition of the fundus oculi —a disseminated choroidal atrophy with pigmentary disturbance. It would be well, therefore, in suspected cases of trypanosomiasis to make an ophthalmoscopic examination. If choroidal disease be a usual feature in the infection, its discovery would be of value in diagnosis, especially in those cases in which the trypanosomes are very scanty in the peripheral circulation.

(3) The improving health in this last case encourages the hope that immunity may be acquired after a time in human trypanosomiasis, and that, therefore, the disease is not necessarily fatal.

SANITATION IN WARM CLIMATES—INDIA.

By Thomas C. Hodson.

Late Indian Civil Service.

A general sketch of sanitation and sanitary measures as they affect the duties of a member of the Civil Service in India may prove of interest even to medical men practising in the Tropics. Not that I can teach them anything new, nor have I any measures to recommend which are not already known to most. Members of the Civil Service in India have, as part of their duty, to administer the sanitary laws promulgated by Government. At all times this is attended with considerable difficulty, and during an epidemic the enforcement of sanitary measures may lead to riot. The need of tact, of forbearance, and yet of persistent determination to do what is best for the good of the native, are ever necessary qualities of the members of the Civil Service, and for the most part they are forthcoming.

The enthusiastic sanitary reformer must bear in mind the fact that sanitary science, as indeed all science, is a western product and therefore an exotic in an oriental soil. The sanitary measures prevalent in the West, may not be, in fact are not wholly, suitable for tropical climates, and the young sanitary engineer, trained in Great Britain, who in the full enthusiasm of youth, takes up work in a warm climate may lead a municipality into heavy expenses and glaring errors owing to inexperience of the habits of the people he has to deal with. The people of India want to be let alone; the Government they like best is the one that interferes with them least and yet protects them from open violence and depredation; and although we know sanitary reform to be necessary, although we know the lines on which it should proceed, we must ever hang back a little and advance with extreme caution, because it is easy to make mistakes but never easy to repair them or to see the end of them. Apathy is their habitual frame of mind, and new methods are regarded with suspicion.

Sufficiency of Air and Light.—In most European dwellings in India the ventilation and lighting are ample; the necessity for a sufficiency of fresh air in a warm climate being ever present. When the sun's heat is fierce most European dwellings have means of darkening their rooms by shutters, and it is not uncommon to find this exclusion of the sun rays carried to an extreme and prejudicial extent. The native quarters for the most part present a very different state of affairs. There is a tendency amongst all natives to crowd together, and in some of the poorer quarters of the large cities overcrowding prevails to an extraordinary extent. The apathy also of the native members of municipalities and corporations is a retarding factor in sanitation in India; and it is a fact that quite recently the sanitation of Calcutta has greatly improved since the constitution was suspended.

Pure Water.—The ideal system of water supply is one which secures the purity of the water be the source what it may. The attainment of purity in India is dependent, firstly on efficient filtration, and also on the continued cleanliness of the agency of distribution. In one station where I served for some time, the water supply was taken from a hill-stream which seemed beyond all possibility of contamination and the water was distributed in pipes. It was found, however, that the settling tanks needed extra care at the time of the first rains, as otherwise quantities of fine mica were carried down the pipes, with the result that the water drinkers in the station suffered from diarrhœa brought on by irritation of the intestines due to the mica suspended in the water. The question of expense, however, often prevents the introduction of a pipe supply. The alternative is tanks or wells, apart or together. Sometimes the geological formation is such as to prevent the discovery of water by boring, but the tube well system is a favourite with many people because it is cheap and efficient when water exists at no great depth below the surface.

The "tank" system of water supply is in a special degree liable to contamination and it is commonly found necessary to "reserve" certain tanks where police are posted to prevent people from bathing and washing their clothes in them. My own experience is that whenever circumstances have rendered it necessary to have tanks or wells, the civil authorities should always undertake to provide for the protection of the tanks and wells from such pollution. A very great number of difficulties will be obviated if a number of square galvanised iron cisterns were erected, with at least three taps, one for high caste Hindus, one for low caste Hindus, and the third for Mahommedans. These taps should be painted with distinctive colours, red for the high caste, blue for the low caste tap, and green for the Mahommedan. The municipal authorities should arrange for water to be pumped into the tank as often as required, or the matter might be simplified by installing a system of syphonage. It should be clearly borne in mind that the tank system is far and away inferior to the pipe system, if only because the native is not inclined to take more exertion than is absolutely necessary. I have seen people regularly take their drinking water from a filthy stagnant tank, on the banks of which they and their neighbours are in the habit of defecating regularly. I may mention as a curious fact, that I know hill villages in the Khasia hills and in the Manipur State which have an excellent pipe water supply led to the village from an unpolluted stream in hollow bamboo pipes.

The Destruction of Filth.—I will first deal with the disposal of dead bodies. The Mohammedans bury their dead and regard cremation as a gross outrage because it effectually prevents the dead person from entering Paradise. The Hindu burns his dead or drops them into the Ganges, with the exception of those who die from small-pox. The Parsi exposes his dead on the Towers of Silence where the bodies are devoured by the vultures. Europeans are usually buried, but a cremation society has been formed in Calcutta. I

omit mention of one or two quaint and unusual methods of disposing of the dead which are practised by the hill tribes in Assam.

Cremation as ordinarily carried out by Hindus is fairly satisfactory; but there are times when the burning ghats require supervision, especially during epidemics. The experienced civil officer knows very well that there is a good deal of poisoning in India, and that cremation very effectually prevents the detection of many crimes. There is in India very little registration of deaths, and the whole matter of death certificates and vital statistics is in a most unsatisfactory condition; and it would be quite impossible to insist on the general observance of regulations, such as those which have been formulated by the Committee of the Home Department, which was appointed in view of the provisions of the Cremation Act, 1902. In times of epidemics cremation in India is often hasty and incomplete, a fact in which Sir Alfred Lyall finds an explanation of the Hindu practice of burying those who die of small-pox. No changes, however, can be introduced save in the way of extending cremation among Europeans and native Christians and in gradually insisting that Hindu cremation shall be decently and efficiently conducted. Both the Mahommedans and the Parsis, declare their respective methods of disposing of the dead to be intimately associated with their religion.

The Disposal of Fæcal Matter and Sewage.—An efficient system of outfall drainage is not maintained, nor is it possible in the vast majority of towns in India; and after all such systems are very costly to provide and to maintain. So many towns in India are inland towns and the central Government would never allow a system of drainage to be introduced to any town which might prejudicially affect their smaller neighbours. The system therefore must be self-contained, and must provide for the town as an unit without in any degree interfering with the comfort or sanitation of their neighbours. India is still a country of small villages and small towns. There are two systems in actual force, the Trench system and the Incinerator system.

(1) The advantage of the TRENCH system seems to consist in the fact that it is cheap, and that the "mehtar" or "sweeper" has no difficulty in understanding what he has to do. The trenches should be wide and shallow, so that the bactericidal action of the sun may have full effect. This system is, however, practicable only on a small scale and in places where land is cheap. It is not possible to use it with advantage in places where the soil is alluvial or clayey and capable of retaining moisture, and in the rains which vary from 680 inches in Cherra Puriji to 15 inches in Ajmere and less, trenches are almost worse than useless. Light, dry soil is necessary for the proper working of the Trench system.

(2) As regards the INCINERATOR system, it is undoubtedly much more efficient than its rival, but it must be absolutely simple and there must be complete combustion, otherwise the smell is intolerably disgusting. The need for simplicity is absolute, because the incinerator is practically left in charge of the lowest caste and most ignorant of natives. I know from my experience of Imphal, the capital of Manipur, a town of 30,000 inhabitants, that the incinerator system can be worked successfully if there is constant supervision.

In the villages of "rural India" there is as yet no attempt at sanitation. The crow, the kite, the vulture, the pariah dog, the pig, act as scavengers, with very considerable success. The strong, hot sun must destroy what there remains, but the hosts of evil flies and insects pollute the food and water. The first thing to do is to interest the people. It is difficult but it is not impossible. Extreme tact is necessary because they view our innovations with jealous suspicions. There are only too many lying tongues to whisper a hint of poisoned wells, of defilement of caste and horrors innumerable when sanitary measures are commenced. There is seldom open opposition, and it is almost never possible to track these malicious lies home to their authors. Therefore the sanitary reformer must go prudently and avoid offending native prejudice.

Epidemic Diseases.—Cholera, enteric, plague, small-pox, malaria, are the five epidemic diseases, against which the sanitarian has to devise special prophylactic measures. Two of these are so essentially waterborne diseases, and there is a mass of evidence to show that flies and insects also convey the infection. The purity of the water supply must therefore be primarily secured. As to keeping down flies, not an easy thing in a hot climate, an old servant of mine once remonstrated with me for ordering the servants to clean off the cobwebs, as he said the spiders ate the flies, and destroyed the poisonous flies. There may be something in it, and perhaps some scientist will eventually prove that spiders play a very valuable part as scavengers in the economy of Nature. In cantonments where the young soldier, who is particularly liable to enteric, has long, weary hours to wile away, everything should be done to see that he drinks wholesome water, plain or aerated. There are soda water manufactories in the slums which take their water from filthy, stagnant tanks, which receive the sewage of the surrounding huts. These tanks ought to be filled up and the manufactories controlled much more rigorously than is done at present. I am not able to speak of the value of inoculation as a preventive of these two diseases, but in times of epidemic it should be employed as far as possible, if only for its "moral" effect. In cholera epidemics prophylactics, such as daily doses of dilute sulphuric acid, or pills of quinine and carbolic acid, can be used with great advantage, but as the following story shows, it is well for the white man to take the lead. A distinguished officer who commanded a Pioneer (native) regiment told me that on return from China his regiment was posted to a station in a plague-infected area. He was ordered to get as many of his regiment inoculated as possible. He paraded his regiment and made an earnest appeal to them, concluding his address by inviting any objector to step forward and state his objection. A white-haired Subadar came forward, and said: "Sahib, we have been told that if this is done to us we shall all become lepers and impotent." My friend invited the Subadar to pick a tube with which he was immediately inoculated. The British officers were all inoculated, and every native soldier but two submitted themselves to the process. Of

course it is only possible to carry out these prophylactic measures among bodies of men who are subject to discipline such as troops, police, and the prisoners in jails. With regard to cholera, I remember an instructive episode in Manipur. Cholera appeared and two prisoners, whose death seemed imminent, were released and made over to their friends. A few days afterwards two other prisoners were attacked with what was diagnosed as cholera. A sentry reported that he had overheard these two arranging to eat some herb which was really innocuous, but which would produce the symptoms of cholera temporarily. Their ingenuity was not rewarded as they had expected. The native of India possesses a very fair knowledge of simples and herbs, and I will add a little piece of knowledge in the hope that it may be of use. There is a tree, the bark of which is used to simulate the marks of a beating by a stick. The bark is cut into strips, which are pressed against the flesh and leave red weals, which are very difficult of differentiation from the marks of caning.

Plague.—The preventive measures now used against plague are inoculation, inspection, segregation and quarantine. These have practically failed in India because they aroused so much hostility that it was considered prudent to discontinue them. The destruction of rats formed a feature of plague measures in Bombay, but is hardly operative in rural India into which the plague has now spread. There must be careful insistence on general sanitation, a scrupulous observance of building regulations, and on disinfection and the destruction of material which can be reasonably regarded as plague infected. In India it is difficult to allay the unreasoning fears of the ignorant multitude who are excited to suspicion by unscrupulous agitators, and measures which science teaches us to be necessary, to which the Englishman submits himself readily, are there abandoned for political reasons. The position is grave and touches British policy on its weakest spot. Are we to carry out at all costs the measures which we are convinced are necessary, or are we temporise and let the people committed to our care die in their thousands while we look on, helpless, pityingly?

Small-pox.—There is fortunately less opposition in India to vaccination than to most sanitary prophylactic measures, but I read with grave concern in a recent Punjab sanitary report that owing to the unrest created by the plague measures vaccination had to be temporarily suspended.

Malaria.—The prophylaxis of malaria consists essentially in the destruction of the larvæ of the mosquito in the breeding places. This may be effected in two ways; by good drainage and by the systematic use of paraffin. I have referred to the tank system of water supply, and have condemned it on this among other reasons, that the tanks are too often breeding places for mosquitoes. Mosquito nets, mosquito-proof rooms will not be necessary when the malaria carrier has been extirpated. Punkahs are held to be of value, and they will always be used in the hot weather, but as prophylactic measures they are only of second-rate importance. Too often the punkahwalla falls asleep and the punkah stops. One of the causes of the barrack-room crimes is the system which prevailed of letting out the punkah contract only to be again sub-let, with the result that the actual people who pulled the punkah were weak and old and prone to slumber at a time when they ought to have been pulling hard. The climate of India does not improve the temper, and more highly educated people than Tommy Atkins have been known to yield to the temptation to chastise the somnolent punkahwalla. Mechanical fans should be used in every barrack in India.

There are certain broad generalisations which every sanitarian in India should bear in mind. Sanitary reforms mean money, and the provision of money lies entirely in the control of the Civil authorities, who are constantly called upon to adjudicate upon conflicting claims for pecuniary help. The Civil authorities are fully alive to the needs of the situation, and the peculiar system of the Indian Government lends itself to the fullest possible discussion of all these questions by those who are simply and solely actuated by a desire to see the money spent to the best advantage. It is the province of the civilian administrator to know as exactly as he can the feelings of the people in his charge, and though no generalisation on the subject of native opinion can be quite of universal application, I am inclined to think that the education of the people is progressing faster than most people out of India imagine. Vaccination they have become accustomed to, and everything with the native Indian is a question of custom. Inoculation against plague has been practised now for some years with marked benefit, and it is significant that in the Punjab alone 60,000 persons have been so protected against plague.

THE ANTISEPSIS OF MAJOR EYE OPERATIONS, AS PRACTISED BY SOME OF THE LEADING OPHTHALMOLOGISTS OF EUROPE.

By R. H. Elliot, M.B., B.S.Lond., F.R.C.S.Eng., Capt. I.M.S.

(*Continued from page* 73)

DRESSINGS AND BANDAGES.

The methods employed by different operators to safeguard the eye after a serious operation on the ball, are so various and numerous that it is necessary to divide the subject up into a number of heads, in order to facilitate some sort of comparison being made.

(1) THE NATURE AND MATERIAL OF THE DRESSINGS EMPLOYED.

Hjort, of Christiana, has fortunately very few followers. Indeed, I did not meet with a single ophthalmologist in Europe who imitated him in dispensing altogether with bandages, if I may except a Roman surgeon who was diffidently trying the experiment on a small scale. I have heard, however, of an operator who not only uses no dressings, but who even sends his patients straight home from the operating table. I do not think I am passing the limits of fair criticism when I say that such a procedure seems to me to be an outrage on the first

principles of sound surgery. Masselon only differs from Hjort inasmuch as he closes the eye with a thin narrow strip of gauze soaked in collodion, and passing from the forehead on to the cheek; he uses no dressing whatever. De Wecker comes next in order, for his dressing consists of an extremely thin pad of cotton wool between two layers of gauze; it is kept in place by two narrow strips of gauze soaked in collodion. Masselon and de Wecker urge, in favour of their scanty dressing, that the eye is easily and constantly open to inspection, with a minimum of interference. Most operators cover the lids with a thin layer of gauze or lint, and apply over this a padding of absorbent wool. A large number of them sterilise their dressings in an autoclave. Landolt and Hirschberg are most careful to keep the dressings of each patient separate from those of any other. In the former's clinic, each constituent part of each dressing is placed separately in paper before being put into the autoclave, and is only unfolded from its wrapper immediately before being used. Not a few surgeons prefer to soak their dressings in one antiseptic solution or another; to this end various mercurial salts, chinosol, boracic acid, &c., are resorted to. Some almost vie with de Wecker in the scantiness of their dressings, whilst others aim at filling in the whole orbital cup. The late Professor Panas strongly recommended that an almond-shaped pad of wool should be placed between the bridge of the nose and the inner portion of the ball to prevent rotation of the latter; he then filled in the hollow of the orbit with wool. Very few indeed use any iodoform in their dressings nowadays; indeed, I cannot remember having seen it used once. Some years ago it was my practice to fill the orbital cup up with finely-powdered boracic powder, previously sterilised by heat; it gave excellent results, and absorbed moisture well, but was a little inclined to cake, so I abandoned it for steam-sterilised dressings. Straub, of Amsterdam, uses a dressing of his own, consisting of a layer of lint, covered with a sterilised mixture of three parts of ung. zinci and one part of oil; this is kept in place by some strips of plaister applied over a layer of sterilised cotton wool. He claims for it that it restrains secretion and keeps the eye dry.

(2) THE METHODS EMPLOYED TO KEEP THE DRESSING IN PLACE, AND TO PROTECT THE EYE.

Many surgeons are content to rely on bandages alone; others prefer some form of shield, and yet others combine the two. The forms of bandage used are too numerous to describe in detail. Some surgeons prefer a figure-of-eight, and apply it very firmly, whilst others, making use of the same bandage, aim at avoiding all pressure and only draw it sufficiently tight to keep the dressings in place, and no more. Not a few operators fancy one form or another of many-tail bandage. In the *Indian Medical Gazette* for October, 1902, I described and figured Sbordone's (of Naples) bandage of this kind (p. 403), and in the pages of the same journal for May, 1897, I described with the aid of photos the form of appliance I use for my private patients, than which I have seen no better in any part of the world. Most of those who use many-tails pin or otherwise fasten them in front, but in the G. O. Hospital, Madras, a three-tail arrangement, introduced, I believe, by Dr. Drake-Brockmann many years ago, is, or was till lately, in use; one tail is tied above the head, one below the chin, and the third behind the head; it is simple and effective, but has this disadvantage, that the head must be raised every time one wishes to look at the eye. De Haas, of Rotterdam, uses a triangular bandage, suggestive of the St. John Ambulance pattern. A few surgeons bring the patient on to the table with a sort of nightcap on the head, tied by strings under the chin; over this they apply a bandage after operation. Lapersonne uses a plain figure-of-eight over the cap, while Haab, of Zurich, uses a starched bandage instead; needless to say, Haab's method is very secure, but it is hardly suitable for tropical conditions. A few surgeons sew up their bandages to ensure their keeping in place (*ex. gr.* Landolt, of Paris).

The variety of shields in vogue is very great, and the motives underlying their choice are not without interest. Fuchs' wire-gauze shield is widely and deservedly popular; many, however, use metal or celluloid substitutes, perforated for purposes of ventilation. Most such are provided with rounded edges, in order to avoid hurting the patient's face; thus Bouvin and others use a Wolff's celluloid shield with well turned-up margins. Snellen, of Utrecht, on the other hand, makes a point of having the edges of his metal shield sharp, so that they may run into the skin and give pain if interfered with by the patient.

As has already been indicated, not a few ophthalmologists combine some form of shield with a bandage; thus Landolt, after applying the dressings to the operated eye, fastens a Fuchs' shield over them before he puts on a figure-of-eight to close both eyes; his object is to protect the operated eye from the assaults of the patient's fingers. I met several operators who substitute some form of shield for their bandages after a few days; amongst this number were Völckers, of Kiel, Hansen Grut, of Copenhagen, and Juda, of Amsterdam. Others substitute a monocular for a binocular bandage about the third, fourth, or fifth days. Some few, if in doubt as to the condition of the lachrymal passages, use a Fuchs' shield throughout, in preference to any form of bandage (*e.g.*, Hansen Grut, of Copenhagen, and Kanochi, of Warsaw), whilst others omit all dressings, and leave the eye open from the first under such circumstances. It is not very uncommon to find surgeons who bandage the eye at night for some time after they have ceased to do so by day.

(3) THE CHOICE OF MONOCULAR OR BINOCULAR CLOSURE AFTER OPERATION.

I have already mentioned that Hjort, of Christiana, leaves both eyes freely open after operation for cataract; that Masselon, of Paris, closes the operated eye merely by a vertical narrow strip of gauze soaked in collodion; and that de Wecker, using the lightest possible dressing, keeps it in place on the operated eye by the aid of two collodioned strips of gauze. The advocates of monocular bandaging, whilst distinctly in the minority, are yet to be found in many lands; one may mention, as an illustration of this point, the names of Krukoff, of Moscow, Straub, of Amsterdam,

Bouvin, of the Hague, and Hansen Grut, of Copenhagen, who all close only one eye, though they use more dressings than the two Parisian surgeons already mentioned. A few of the names of those whom I have seen employing binocular bandages after cataract extraction, or other such major proceedures, may be likewise mentioned; among such were Fuchs, of Vienna, Haab, of Zurich, Kanochi, of Warsaw, Juda, of Amsterdam, Trousseau and Landolt, of Paris, Sbordone, of Naples, Von Michell, of Berlin, Völckers, of Kiel, and many others. De Wecker argues that binocular closure is a source of senile delirium after extraction. This may be granted, though the complication must be a rare one; I never remember having met with it in about 2,000 extractions performed in India. But in any case, the rational advice to follow would be that given by Fuchs, viz., to release one eye if any signs of this condition appear.

The period during which different surgeons keep the eye or eyes closed varies too widely for any average to be given that would convey useful information; some keep both eyes closed for only twenty-four hours, some for forty-eight hours, and others for longer periods. A common date for the release of the unoperated organ is the third, fourth, or even the fifth day. The operated eye is usually released a few days after its fellow, but a few surgeons open both eyes together. Von Michell continues bandages by night for some time after he has omitted them by day: this has also been my practice with private patients.

Most surgeons use atropine after the operation, commencing the instillations on the third day, when the section has had time to heal and adhesions are not yet very strong. Few seem to begin its use earlier. De Wecker, Snellen, and some other advocates of the simple operation, resort to the use of myotics, either at, after, or just before the operation. The drops are applied in solutions sterilised as already described.

There remain to be considered certain conditions which exercise an indirect but important influence on the attainment of antisepsis.

THE POSITION OF THE OPERATOR.

Comparatively few of the Continental surgeons are ambidextrous, and some of them imitate de Wecker in affecting to consider ambidexterity a form of showing off. Several Indian surgeons, whose operative practice has been so large as to render them almost unaware whether they are using the right or left hand, stand behind their patients for almost all, if not for all operations. I noticed that several of the German operators reversed this practice by working ambidextrously from in front. The great majority of ophthalmologists, however, work on the right eye from behind, and pass to the front for the left. I observed with interest that, whereas most of them preferred to stand to the left front for the eye of the same side, Krukoff, of Moscow, stood at the *right* front for the *left* eye.

Most operators prefer to operate on a table, but not a few use a couch, and some prefer a sloping chair.

There can be little doubt that everything which makes operating easier favours the attainment of a perfect antisepsis. Many surgeons who operate on couches sit down for the purpose. It is not uncommon to see an operator pull his chair up or shift it into position with hands he has just sterilised. On the other hand, he cannot dispense with a chair, or the strain of bending would interfere with the accuracy of his touch. As to choice of station, it seems to me that any one who has sufficient practice in operating to acquire bi-manual dexterity operates at a great advantage if he can stand behind his patient for all manipulations. The matter is not an essential one, and perhaps each man works best in the long run in his own way.

METHOD OF MANAGING PATIENT DURING OPERATION.

Untoward movements of the subject are very apt to result in the instruments coming in contact with his eyelids, his lashes, or some other part of his face. It is therefore of interest to observe the methods adopted by different surgeons to manage their patients. A celebrated ophthalmologist, for whom I have the highest regard, commences a cataract extraction by digging the point of a pin into the patient's nose till he or she bears it without starting. His idea is to prepare the subject for the stages of the real operation. I am inclined to think that sometimes this treatment defeats its own end by making a stupidly nervous patient worse than ever. Many surgeons, both in India and Europe, slap the patient sharply if he proves to be losing control of himself; the effect is often most satisfactory; it steadies many people instantaneously, and they are always the first to recognise after the operation that it was the right thing for the surgeon to do. Most ophthalmologists endeavour in every possible way to quiet their patient, and to establish and maintain his confidence; with this end in view they avoid all sudden movements, and many comment soothingly to him on the progress of the steps of the operation; others utter no word from start to finish, and specially request all bystanders to refrain from talking. My own practice, when dealing with nervous patients, is to administer an injection of morphine a quarter of an hour before commencing the extraction. Such a measure has a very marked and satisfactory effect on the patient, but it is of course necessary to ascertain the state of the kidneys beforehand. Further, it is essential to use a fresh solution and to rub it in well, so as to get early effects, and to avoid subsequent vomiting. Most operators leave both eyes open and direct the patient to look down towards his feet. Hansen Grut, Bjerrum, and others, make the patient hold up his hand or fix his attention on it; others ask a bystander to raise his hand for the same purpose, or have a light held up for fixation; others, again, and I am among the number, operate with the patient's feet towards the light of a window, and bid him look steadily towards the light. This is, of course, impossible in the case of those who prefer to lay their subject parallel with a window, and to place him so that the operated eye is on the window side. De Haas, of Rotterdam, Adelheim, of Moscow, and an English surgeon I have met, all agree in putting a few drops of cocaine into the opposite as well as into the cataractous eye before an extraction, as they think it helps to quiet the patient. For a similar reason, Krukoff closes the sound eye with a wet antiseptic sponge during extraction, and Kanochi, of Warsaw, bandages the second eye throughout the operation. Not a few surgeons take

great trouble with their patients in the few days preceding operation, to teach them to look down or up, as directed, to open their eyes wide, close them gently, &c. Hansen Grut lays special stress on this preliminary training. Tacke, of Brussels, quiets his nervous cataract patients by operating under chloroform if he has reason to fear they will give trouble.

NUMBER AND CHOICE OF ASSISTANTS.

De Haas, of Rotterdam, Sbordone, of Naples, and Rogman, of Ghent, prefer to operate without any help from assistants, thus reducing to a minimum the number of hands which may be possible sources of infection. Others are most particular to allow none to help them who have not carefully sterilised their hands, &c., beforehand, and therefore limit themselves rigidly to chosen assistants, each of whom has his own work to do. Some have only one assistant; others prefer to have one as chief assistant, one to look after the instruments, and one for the lamp. M'Keown always has a special assistant for the management of the irrigator, and I imitate him in this. It is indeed a matter of no small interest to notice how greatly the number of assistants around an operating table will vary, and that, too, in the clinics of men who are all equally careful to observe a strict antiseptic *régime*.

Hirschberg, who is nothing if not thorough, asks all bystanders to don sterilised overalls, of the same pattern as those worn by himself and his helpers. Landolt, who vies with Hirschberg in thoroughness, asks all who assist him to follow his example by wearing loose sterilised, linen gloves from the moment of washing their hands till the commencement of the operation; thus all risk of re-contamination is avoided. Hirschberg allows no one but himself to touch his instruments, which he gets ready and sterilises with his own hands. Every operation has its own set of instruments.

MISCELLANEOUS.

Schnabl, of Vienna, and Sbordone, of Naples, prefer to operate on both eyes at the same sitting for double cataract. Most operators consider this a surgically unsound procedure.

Not a few surgeons make a point of operating as soon as they reach their clinics, with the double motive of avoiding any risk of carrying infection from the wards to the operation-table, and of giving their best and freshest moments to the responsible work of the theatre.

MALARIAL PROPHYLAXIS IN NEW YORK.—The Board of Health has issued a circular letter to all the medical men in New York City to report all cases of malarial fever coming under their observation. The corps of inspectors have also been requested to report the locatity of all sunken plots and excavations in which water may remain and become stagnant. These are to be drained or filled in; and all rain barrels and pools in backyards are to be inspected and examined for the larvæ of mosquitoes.

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THE
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MARCH 16, 1903.

TROPICAL SANITATION.

THE announcement that a section devoted to the subject of Tropical Sanitation is to be held at the meeting of the Royal Institute of Public Health at Liverpool on July 15th, is one which we are sure will be welcomed, not only by medical men, but by every one interested in the welfare of our tropical colonies and possessions. It is a subject of vital importance and of intense interest, and opens up a field of practical hygiene which appears, at the present day, illimitable. Tropical sanitation will for years to come constitute a subject for discussion, and one which must involve experiment, expense, and careful watching.

Sanitation may be defined as "the science of sanitary conditions and of preserving health," and, therefore, synonymous with the term hygiene; but it is frequently restricted to

indicate "the method and apparatus for making and maintaining houses healthy." The latter signification is sufficiently important and comprehensive as a field for our labours at present, and perhaps it would be well were the discussion to be held at Liverpool confined to the question of municipal and household sanitation merely. At present there is a prize, the Belilios Prize, being offered by the JOURNAL OF TROPICAL MEDICINE for the best article on "The System of Drainage and Sewerage (Domestic and Municipal) best suited for Tropical Climates;" and, we are led to understand that, a discussion on a similar subject is to be held by the Section of Tropical Diseases at the British Medical Association meeting at Swansea.

It is only by accumulated experience that even approximately accurate conclusions can be arrived at, and it is hoped that the several channels opened up by which such experience can be announced will prove of ultimate usefulness. Native methods of sanitation are many, and they vary according to race, religion, altitude, custom, climate, geological formation, &c. Seeing that, even in Britain, certain sanitary methods are suitable according as the city or place to be dealt with is situated on shore or inland, on low-lying levels or on high ground, how much more must they essentially differ when the whole belt of the world termed tropical has to be dealt with.

The application of British methods of sanitation to tropical countries is a question which we have as yet but few instances whereby we may arrive at a correct solution; although, in many of our Crown colonies, home methods of municipal sanitation are being introduced. It may be there can be no discussion concerning the wisdom of laying on a public water supply and of shutting up native wells; but the disposal of sewage and of storm water have hardly been dealt with; or if here and there attempted on something like a scientific basis, the instances are too few or imperfect to justify even approximate conclusions as to efficacy.

One of the Crown colonies in which home methods of municipal sanitation have been tried to perhaps a greater extent than any other has been in Hong Kong. Mr. Chadwick has been thrice invited, by the Government of that colony, to advise as to the best methods of sanitation suitable for the peculiar requirements of Hong Kong. During his last visit Mr. Chadwick was accompanied by Professor W. J. Simpson, and an able and elaborate report was drawn up by these two experts after a prolonged study of the immediate conditions on the spot. We would advise our readers to carefully study that report, and to take it as a basis on which to model sanitation for tropical cities, modified, of course, as it must be, to suit the particular region of the tropics in which they are interested.

We hope in an early issue to commence the publication of a series of lectures on Tropical Hygiene by Professor Simpson, and, thereby, acquaint medical men and Government authorities in Crown colonies with the modern methods of hygiene and sanitation adapted to their particular needs.

Reprint.

THE ETIOLOGY OF SLEEPING SICKNESS.[1]

(PRELIMINARY NOTE.)

By ALDO CASTELLANI, M.D., Florence.

SEVERAL germs have been described as the cause of sleeping sickness. Cagigal and Lepierre in 1897 announced that they had isolated a bacillus from the blood of a patient suffering from sleeping sickness, which when injected into animals was able to reproduce the disease; but these experiments of the two Portuguese medical men were not confirmed later by Brault and Lapin. Next, Marchoux, basing his statements on the following observations, is of the opinion that sleeping sickness is due to Fränkel's diplococcus. At the *post-mortem* examination in a case of sleeping sickness where the patient was suffering also from pericarditis, he found Fränkel's diplococcus in the exudation of the pericardium. It is worth noting that he found the germ in the pericardium only, and not in the cerebrospinal fluid or in any other situation. In a second case, complicated by chronic rhinitis and suppuration in the sinus frontalis, the secretion of the nose showed the same micro-organism. Besides these two observations, to which I do not think a great amount of importance can be attached, Marchoux was brought to this hypothesis by having noticed that sleeping sickness sometimes developed in people who had suffered from pneumonia.

[1] A paper read before the Royal Society and published in he *Lancet* by request.

Lately there have been the bacteriological researches of the Portuguese Commission and those of Dr. Broeden. The Portuguese describe a germ (a diplo-streptococcus, to use their denomination) which they state they have found constantly in the cerebrospinal fluid at the *post-mortem* examination of their cases. They state that they have also found the same organism in patients during life; constantly in the blood of patients examined for this purpose, and very frequently in the cerebrospinal fluid taken by lumbar puncture. The characteristic of their organism is that it does not usually grow on the ordinary culture media like agar, glycerine-agar, &c., and not at all on gelatin. The Portuguese do not mention having made any attempt to see if the blood of patients suffering from sleeping sickness has any agglutination power on their germ.

Dr. Broeden, Director of the Bacteriological Laboratory at Leopoldville, describes as the cause of the disease a bacillus which is slightly motile, producing a pelliclein bouillon and growing abundantly on potatoes. He was able to find the germ constantly in the blood of all his patients. The bacillus was not agglutinated by the blood of patients suffering from sleeping sickness.

In this short note I propose to give only a brief account of my experiments and researches. I must state first that I have never been able to find any of the germs described by my predecessors, but, on the other hand, I have found an organism which I think I have good reasons to consider to be the cause of sleeping sickness. I have grown it with absolute certainty (and always pure) in eight out of ten *post-mortem* examinations, from the cerebrospinal fluid, and from blood of the heart taken with aseptic precautions. *In vitâ* I have found it only once in the blood, but I have grown it in two cases out of three from the cerebrospinal fluid removed by lumbar puncture.

Description of the Organism.—The germ may be considered as a distinct variety of the streptococcus group. The microscopic appearance is very variable, depending on the different media on which the germ has been cultivated and on the different times of growth, &c., all transitions from long chains to typical diplococci being seen. The form and size of individuals are also, within certain limits, variable. Frequently about the chain and the diplococcus forms well-defined mucoid capsules (*Schleimhüllen*) are seen, and in hanging-drop preparations the short chains and the diplococci forms show a well-marked Brownian movement.

Staining Properties.—It is easily stained with the ordinary solutions of the different aniline dyes.

Cultivation—Gelatin.—Growth occurs very well on gelatin at a temperature of about 22° C. and also below. In a stab culture the stab is generally thread-shaped, although sometimes it may appear a little granular; the surface growth is very slight. In streak cultures the colonies coalesce, forming a mass with a fine granular surface and sometimes wavy borders. In some few cases after five or six days I have noticed a very slight liquefaction of the gelatin.

Agar.—In a stab culture growth takes place luxuriantly along the stab, the surface growth being generally more delicate. In streak cultures in most cases the growth is very vigorous, the colonies not remaining separate but coalescing into a whitish mass with granular surface and wavy borders. In none of the cultures is the typical growth of the streptococcus pyogenes seen—viz., the collection along the stab of small circular semi-translucent discs, which show a great tendency to remain separate. Still, in rare cases —especially if the agar is old—the growth may be much more delicate and the colonies may remain separate. The water of condensation shows, as a rule, a slight whitish deposit.

Glycerine-agar.—The growth is the same as on agar, but rather more delicate.

Sugar-agar.—There is no gas formation.

Litmus-agar.—The colour of the medium does not change.

Potatoes.—There is very slight growth, sometimes none.

Bouillon.—The appearance of bouillon cultures varies greatly. In the majority of cases the bouillon remains clear and there is a flocculent and sometimes sandy sediment. In these cultures one generally finds long chains on microscopic examination. In some cases the bouillon is cloudy, with little or no sediment, and in cultures of such an appearance microscopical examination will often show the cocci arranged in pairs and in short chains. The same strain of germ sometimes will make the bouillon cloudy and sometimes not. I once inoculated a tube of bouillon from an agar culture and obtained a bouillon culture with no turbidity and with a well-marked flocculent sediment. Two weeks later I inoculated another tube of bouillon from the same agar culture, but this time the bouillon became cloudy and the sediment was very slight. In a strongly alkaline bouillon it is easy to obtain a diffuse cloudiness. The same observation has been made by Waldvogel with other varieties of streptococci.

Serum.—There is good growth, but more delicate than in agar.

Milk.—There is no coagulation. This is an important character of differentiation from the *Streptococcus pyogenes*, as well as from Fränkel's diplococcus, both of which produce coagulation (Kruse, Pansini, Lehmann).

Relation to Oxygen.—The micro-organism is a facultative anaërobe.

Agglutination.—Experiments have just been begun to determine if the germ is agglutinated by the blood of patients suffering from sleeping sickness. The experiments are still too few for one to come to any definite conclusion, but as far as they have gone the results have been very satisfactory.

Conclusions.—From the description just given I think that this germ must be considered a new variety of streptococcus. Every bacteriologist knows how difficult it is to differentiate sharply the varieties of streptococci on account of the numerous transition forms that occur, even a sharp separation between the *Streptococcus pyogenes* and the *Streptococcus lanceolatus*[1] (Fränkel's diplococcus) seeming to many

[1] I follow the classification and nomenclature of Lehmann (*Lehrbuch der Speziellen Bacteriologischen Diagnostik*).

observers to be impossible. Still, I think that the streptococcus I have found may be regarded as a distinct variety. The cultivation on gelatin is sufficient to differentiate it from the *Streptococcus lanceolatus*, as the latter does not grow at all, or only very badly, on that medium. Besides, the agar cultures of my streptococcus have not the dewdrop-like appearance of those of the *Streptococcus lanceolatus*. It is differentiated from the *Streptococcus pyogenes* by its much more vigorous growth on all media, and especially on agar, by the tendency of its colonies to coalesce, and by the noncoagulation of milk. As regards the diplostreptococcus of the Portuguese I do not think any confusion can arise. The Portuguese state that the culture of their germ generally failed every time on the usual media like agar, gelatin-agar, &c., and with gelatin they never succeeded in obtaining cultures.

The streptococcus that I have described grows very well on gelatin and on all the other usual media. This character differentiates the organism also from the *Streptococcus intracellularis* (*Diplococcus intracellularis* of Weichselbaum) which does not grow at all, or very badly, on gelatin, and also, according to some observers (Lehmann), on cow serum.

My experiments are not complete and they are not yet numerous enough; still, having grown my germ (always pure) in eight out of ten *post-mortem* examinations, and having grown it from the cerebrospinal fluid taken *in vitâ* by lumbar puncture in two out of three patients, and having also had, as far as I have gone, very satisfactory results as regards agglutination, I think that I am not wrong in stating that according to all probability the cause of sleeping sickness is to be looked for in this germ. I think that this organism is a distinct variety of streptococcus, to be classed between the *Streptococcus pyogenes* and the *Streptococcus lanceolatus* (Fränkel's diplococcus), and it might be called the streptococcus of sleeping sickness.

Additions and Modifications to my Preliminary Note.

(1) Counting the last *post-mortem* examination I have grown the micro-organism in nine out of eleven *post-mortem* examinations.

(2) *Microscopical Appearances.*—To be added, the following: In old cultures involution forms are produced; frequently single members present much larger dimensions and sometimes (as Stoltz has already observed in *Streptococcus lanceolatus*, *Centralblatt für Bakteriologie*, Band xxiv., S. 337) they present the form of a club.

(3) *Gelatin.*—The description given is not to be changed.

(4) *Agar.*—As regards the agar stab, I do not modify anything.

Agar Streak.—Instead of the description I gave I would put simply the following: The growth is generally much more vigorous than the typical *Streptococcus pyogenes* and the *Streptococcus lanceolatus*, the colonies showing a marked tendency to coalesce. Still, in some cases the growth may be much more delicate than usual and the colonies may remain separate.

(5) *Bouillon.*—I have nothing to change, but I would add the following: The bouillon tubes presenting a general cloudiness at a microscopical examination show chains and diplococci forms, sometimes diplococci forms only.

(6) At the end of the paper, where I make the differential diagnosis between my streptococcus and the other varieties of streptococci, I have written in my note that the streptococcus which I have described is differentiated from the *Streptococcus lanceolatus* because it grows well on gelatin; *besides, in the agar cultures of my germ I have never seen the dewdrop-like appearance of the agar culture of the Streptococcus lanceolatus.* I should, perhaps, like to omit from my note the last sentence, which I have italicised, or at least to modify it, because some recent experiments have shown me that the agar cultures of my germ may show in *rare cases and special circumstances* (very old agar, &c.) a certain likeness to the agar culture of the *Streptococcus lanceolatus*. Besides, I think, the fact that my germ grows well on gelatin is quite sufficient to distinguish it from the *Streptococcus lanceolatus*.

BIBLIOGRAPHY.

Brault and Lapin: *Archives de Parasitologie*, 1898, No. 3. Broeden: *Bulletin de l'Académie Royale de Médecine de Belgique*, 1901. Cagigal and Lepierra: *Coimbra Medica*, 1897, quoted by Scheube, *Die Krankheiten der warmen Länder*, p. 565. Kruse, Flügge: *Die Micro-organismen, Leipsic*, 1896. Kruse and Pansini: *Zeitschrift für Hygiene*, Band xi. Lehmann and Neumann: *Lehrbuch der Speziellen Bakteriologischen Diagnostik.* Marchoux: *Annales de l'Institut Pasteur*, 1899, No. 3. Portuguese Scientific Commission: Journal of Tropical Medicine, June 2nd and following numbers.

Entebbe.

THE ROYAL INSTITUTE OF PUBLIC HEALTH.

Tropical Sanitation.

At the meeting of the Royal Institute of Public Health to be held at Liverpool, July 15th and 21st, 1903, a section devoted to *Tropical Sanitation* is to be held.

The following have been nominated as officers of the Section: *President:* Professor Nocht, Hamburg. *Vice-Presidents:* Lieut-Colonel Crombie, M.D., C.B.; Major Ronald Ross, C.B., F.R.S. *Secretaries:* J. W. W. Stephens, M.D., D.P.H., University College, Liverpool; James Cantlie, M.B., D.P.H., 46, Devonshire Street, London, W.

Announcement of papers to be read should be sent to either of the Secretaries of the Section.

Reviews.

Report on Malaria at Ismailia and Suez. By Ronald Ross, C.B., F.R.S. Pp. 24. Price 1s. Longmans, Green and Co., London.

A more concise and instructive report on malaria, its prevalence and methods of extinction, it has not been our privilege to read. The peculiarly isolated position of Ismailia rendered the work, to an expert of Major Ross's experience, an easy matter, but never-

theless he has given us a most valuable contribution to the literature of the etiology and prophylaxis of malaria.

Ismailia, a town of some 7,000 persons, is built in the desert near the brackish Lake Timsah. Anopheles mosquitoes were found in numbers, and were identified as belonging to the *A. pharœnsis* and *A. chandoyei* by Mr. F. V. Theobald.

The parasites of malaria met with were of the benign tertian and the æstivo-autumnal varieties. In the fresh water canal, owing probably to the presence of fish, no anopheles larvæ were found, but in the marshes connected with the natural (sub-soil) waters around Ismailia the larvæ of anopheles and of culex were numerous. Even in brackish water containing as much as 9 grammes of salt per litre anopheles were found, and it is therefore clear that the insects do not demand entirely sweet water for their existence. Although the small marshy pools exist for miles around Ismailia, Major Ross remarks that it is only the pools near the town that require special attention, as mosquitoes seldom fly further than a few hundred metres.

In reviewing the measures frequently recommended for dealing with malaria, Major Ross discusses the administration of quinine, screens and wire gauze fixed to the doors and windows, the segregation of Europeans from natives, and the extirpation of mosquitoes. Concerning these measures he remarks: "The fact that the malaria has continued in spite of the use of mosquito nets by the patients, and also in spite of assiduous treatment by quinine shows, as I have often suspected, that such measures are not of themselves sufficient so long as the propagation of the carriers of the disease is not arrested. The use both of quinine and of mosquito nets can be looked upon only as a partial protection." The method of prophylaxis by extirpation of mosquitoes, in the case of Ismailia, he recommends in preference to all other measures, but advocates quinine and the mosquito net as admirable subsidiary aids to the elimination of malaria. We are glad to see that Major Ross draws attention to the pernicious belief, still maintained, and chiefly by the laity, that malaria can be spread by other means than by mosquito bites; he says "there is no trustworthy evidence in favour of such a conception, and the belief is merely a superstition."

Notes and News.

Instruction in Tropical Diseases in Paris.—The appointments to the Institute of Colonial Medicine in Paris have now been completed: Professor Brouardel, Director; Professor Deboue, Dean of the School; Professor Chantemesse, Teacher of Bacteriological and Hæmatological Technique; Professor Blanchard, Parasitology; Professor Le Dentu, Tropical Surgery; Professor de Lapersonne, Tropical Ophthalmology; Professor Wurtz, Tropical Hygiene; Professor Jeanselme, Tropical Skin Diseases.

Opium Poisoning.—*Serum Treatment of the Morphia Habit and Opium Poisoning.*—The preparation of a serum by Hirschlaff, from rabbits treated with small and continuous doses of morphia, seems to give promise of the production of a remedy, which may help to counteract the severe symptoms at times set up by sudden suspension of the opium habit. Hirschlaff submitted 83 rabbits, from three weeks to five months, to small doses of morphia, commencing with ·015 grammes increasing to ·51 grammes at a dose; as much as 1·2 grammes being administered per day. Some rabbits received during the entire course of the experiment as much as 63·61 grammes in all. The serum derived from these rabbits gave protecting powers against otherwise fatal doses of morphia for both rabbits and mice. The serum was further employed in acute and chronic poisoning by opium and morphia in human beings. A woman who had taken 12·45 grammes of tincture of opium recovered under treatment with this serum. Five persons who had acquired the morphia habit were also given the serum, the morphia injections being at the same time suddenly left off. All previous attempts at suspension had been attended by severe symptoms, but after one to three injections of the morphinised serum no symptoms were observed. It is to be hoped this plan of treatment will be tried upon opium eaters and opium smokers, and the effects recorded. Should it prove successful an important therapeutic agent will be at hand for the relief of the morphia habit.—*Berliner Klin. Wochenschrift.* Berlin. [Serum Treatment of Morphia Intoxication.] L. Hirschlaff.—*Ein Heilserum zur Bekämpfung der Morphium-Vergiftung und ähnlichen Intoxicationen.*

Plague.—In several cities of Mexico plague has appeared, but the disease prevails most severely in Mazatlan, from which it is reported one-third of the 15,000 inhabitants have fled to escape the disease. The infection is supposed to have reached Mazatlan from San Francisco by rats on board ship. On January 31st 150 deaths had occurred in Mazatlan alone.

The London School of Tropical Medicine announces that the "Craggs Research Prize of £50" will be awarded in October to a past or present Student of the School who during the past current year has made the most valuable contribution to Tropical Medicine. Full information may be obtained from the Medical Tutor at the School, Royal Albert Docks, London.

Books Recently Issued.

The Malarial Fevers of British Malaya.—Studies from Institute for Medical Research, Federated Malay States. By Hamilton Wright. No. 1, vol. i. Price 3s. Messrs. J. and A. Churchill, London.

Inoculation against Malaria. — By P. Kuhn. Translated by H. A. Nesbitt. Price 2s. Messrs. J. and A. Churchill.

Second Report of the Progress of the Campaign against Mosquitoes in Sierra Leone.—

By M. Logan Taylor. Memoir v., part 11, Liverpool School of Tropical Medicine. Price 1s. Messrs. Longman, Green and Co., London.

THE NURSE IN HOT CLIMATES. — Revised and printed from *The Hospital* Journal by S. Henderson. Price 1s. The Scientific Press, Ltd., London.

MOSQUITO BRIGADES AND HOW TO ORGANISE THEM. By Ronald Ross, C.B., F.R.S. Messrs. George Philip and Son, London.

TYPHOID FEVER. — By J. T. Moore. Price One Dollar. Messrs. G. P. Engelhard and Co., Chicago.

A MANUAL OF FAMILY MEDICINE AND HYGIENE FOR INDIA.—By Sir William Moore, K.C.I.E. Price 12s. Messrs. J. and A. Churchill, London.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists, the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical Journals in which the articles appear.*

Ankylostomiasis.

ANKYLOSTOMIASIS OR UNCINARIASIS, by J. A. Capps. —*Journal of the American Medical Association*, January 3rd, 1903.

Antisepsis or Asepsis in the Field.

Dr. Axhausen (*Allgem. milét. Zeitung*, 1902, p. 47), in a carefully written article, lays down the following axioms for what he considers the ideal method for dressing wounds on the field of battle:—

(1) A petty officer of the Army Medical Corps should remove the garments from the injured part without, however, touching the wound.

(2) A surgeon, an *aseptic dresser*, after having carefully disinfected his hands, should bandage the wound with a sterilised dressing.

(3) Another surgeon has to take in hand the dressing of wounds that require special care.

The aseptic air-tight bandage is a durable dressing and therefore very economical. Less water is necessary for it than is needful for the antiseptic dressings preceded by washings. All exploration except by the most simple methods should be discarded as useless and injurious.

Regulations of the most rigorous asepsis should be observed in field hospitals, and the infected wounded should be separated from the aseptic wounded, and should be in different wards and tended and bandaged by different attendants.

Bilharzia.

BILHARZIA IN INDIA, by Arthur Powell. — *Brit. Med. Journ.*, February 28th, 1903. Powell reports a case of bilharzia in a native of Bombay, and Major Childe has seen the disease in Persians. Indian bred cattle are also stated to be subject to the disease.

Cholera (and Dysentery).

(1) THE USE OF BENZOYL-ACETYL PEROXIDE AS AN INTESTINAL ANTISEPTIC IN CHOLERA AND DYSENTERY. —Dr. Paul C. Freer, Superintendent of United State Government Laboratories, writes from Manila concerning the preparation of benzoyl-acetyl peroxide, and its use as an intestinal antiseptic in cholera and dysentery.

After preliminary experiments, conducted in a small emergency hospital, the treatment of cholera at the tent hospital at San Lazaro divided itself into two methods: (1) The administration of benzoyl-acetyl peroxide in solution and in capsules, as an intestinal antiseptic for the destruction of the bacilli; and (2) the administration of stimulants, to enable the patient to survive, if possible, the effect of the toxin already present.

The solution given by the mouth, having been found, if persisted in, to produce protracted vomiting, was discontinued, and high rectal injections of 1 to 1,000 solution were given every four hours during the acute stage of the disease. This treatment seemed to give relief, and was largely due to mechanical action, from the sudden dilation of the large intestine, but, as shown in subsequent hospital experience, benzoyl-acetyl peroxide has also a stimulating effect.

Dr. Thos. R. Marshall, who had charge of another tent hospital, adopted three methods of treatment for cholera: (1) Benzoyl-acetyl peroxide; (2) the solution mixed with other remedies; and (3) remedies other than benzoyl-acetyl peroxide. The most efficacious mode of administration was found to be by rectal injections of 1 to 1,000 solution, mixed with a normal salt solution of equal quantity. At the Santiago Hospital, under the charge of Drs. Southall and Lindley, where benzoyl-acetyl peroxide was given the most exhaustive and extended trial, the results worked out as follows: The guaiacol carbonate and calomel treatment was used in fifty-four cases, and showed a percentage of recoveries of 14·18; against this, benzoyl-acetyl peroxide, mixed with guaiacol carbonate and calomel, had a total recovery of 41·94 per cent., and benzoyl-acetyl peroxide alone of 40·42 per cent. Four hundred and eight cases were treated with either benzoyl-acetyl peroxide or the same mixed with guaiacol carbonate and calomel, and of these 169 recovered; 593 received other treatment, and of these only 106 recovered.

With regard to benzoyl-acetyl peroxide in amœbic dysentery, Dr. Freer reports that its use has been attended with very beneficial effects.

Dr. R. P. Strong, of the Biological Laboratory, Manila, thus writes with respect to the properties of the preparation: "Quinine used in enemata has hitherto usually given the best results in the treatment of amœbic dysentery. The advantages of benzoyl-acetyl peroxide over quinine, however, are apparent, for the latter, while quite capable of killing amœbæ, even in dilute solutions, also attacks the bacteria which are present in the intestines, and it has been found possible, by its use, to reduce greatly the number of micro-organisms in the stools."

It may then be said that, upon the whole, the experiments undertaken in Manila with the view of testing the efficacy of benzoyl-acetyl peroxide in the treatment of cholera and dysentery have been attended with a considerable amount of success. The preparation has probably proved its value as an intestinal

antiseptic in these diseases. — *Medical Record*, January 10th, 1903.

(2) A Study of a Bacillus resembling the Bacillus of Shiga from a case of Fatal Diarrhœa in a Child, with remarks on the Recognition of Dysentery, Typhoid and Allied Bacilli, by Philip H. Hiss, jun., and F. F. Russell. — *Med. News*, New York, February 14th, 1903.

(3) Treatment of Acute and Chronic Dysentery, by M. Goltman.—*Memphis Medical Monthly*, February, 1903. Goltman considers anal divulsion is a prime factor in facilitating the work of flushing the colon, and that the treatment of dysentery, acute or chronic, by topical application is rational.

(4) Note on the Bacteriology of Dysentery and the Value of the Serum Test in its Differentiation, by Leonard Rogers.—*Indian Medical Gazette*, February, 1903.

(5) Jelks states that in rectal surgery formalin is the most reliable antiseptic; and in chronic dysentery the use of hot formalin enemata give excellent results. —*Hot Springs Med. Journ.*, December, 1902.

Enteric Fever.

(1) Two Cases of Perforation in Typhoid Fever, in one of which an operation was performed, by James H. Lloyd and Thomas L. Coley. — *Philadel. Med. Journ.*, January 17th, 1903.

(2) Two Erroneous Surgical Decisions in Intestinal Perforation from Typhoid Fever, by John H. Roberts. —*Philadel. Med. Journ.*, January 17th, 1903.

(3) Some Epidemics of Typhoid Fever caused by Infected Water and Milk, by I. C. Gable.—*Penn. Med. Journ.*, Pittsburg, December, 1902.

(4) Treatment of Typhoid Fever, by L. F. Hammond.—*Louisville Monthly Journ., Med. and Surg.*, January, 1903.

(5) Treatment of Typhoid Fever with Castor Oil, by C. C. Bass. — *Med. Fortnightly*, St. Louis, January 10th.

(6) Typhoid Fever—Bacteriology, Diagnosis and Differential Diagnosis, Value of Widal's Agglutination Test, Ehrlictes Diazo-reaction and direct Examination of the Blood, by E. E. Maxey.—*Med. Sentinel*, Portland, Oreg., December, 1902.

(7) Some Observations and Comments on the Spread of Typhoid Fever, by C. W. Shaff.—*Med. Sentinel*, Portland, Oreg., December, 1902.

Epidemic Œdema (Dropsy?).

A Report of Thirteen Cases of Œdema, apparently Epidemic in Character, by Halsey de Wolf. *Arch. of Pediatrics*, New York, December, 1902.—Thirteen infants in a Lying-in Hospital developed œdema after a severe bowel disturbance, possibly due to milk. Nine of the children died, and four left the hospital before the result was declared.

Fever, Undetermined.

M. J. Brandts describes a peculiar form of fever which recently followed an epidemic of dengue fever in East Java. It was highly contagious, in which particular it resembled dengue, but differed from that disease, inasmuch as the typical pains in the limbs were absent, some of the cases exhibited a terminal exanthem, and therefore it may be conjectured that this form of fever is only a variety of dengue.

In 1894 van der Scheer and v. Dorssen observed a form of fever in Batavia that set in suddenly, was either of a remittent or continuous type, and persisted for about five or six days, when recovery ensued without a period of convalescence. This fever was called "van der Scheer's fever." It followed an epidemic of influenza in Batavia, and in some cases the body was covered with a rash and the respiratory organs were affected. Probably the fever in East Java was similar to that met with in Batavia.—*Geneesk. Tydschrift v. Nederl. Ind.*, 1902, No. 42.

Intestinal Worms.

Why Parasitic Worms are not Digested.—*Borch. Centralblatt*, January 15th, 1903. Weinland finds that from the round worms from the pig's intestine a fluid can be expressed, which prevents the gastric and pancreatic juices of the animal digesting the worms. He considers the resistance to be due to an antiferment which neutralises the effect of the peptic ferment. Boiling destroys the antiferment.

Lathyrism.

The Inquiry into Lathyrism. — *Indian Medical Gazette*. February, 1903.

Liver and Bile Ducts.

(1) Causes of Recurrence of Biliary Symptoms after Cholecystotomy, by Charles S. Hamilton.—*Amer. Journ. of Obstet.*, New York, December, 1902.

(2) Surgical Treatment of Gall-stones, by J. F. W. Ross, *Canada Lancet*, Toronto, January, 1903.

(3) Cirrhosis of Liver in the Young, by J. T. Fotheringham.—*Canada Lancet*, January, 1903.

(4) Vicious Peritoneal Adhesions of the Duodenohepatic Region, by J. P. Warbasse.—*Brooklyn Med. Journ.*, January, 1903.

(5) Simple Cysts of the Liver, by Basil Kilvingston. —*Inter. Col. Med. Journ.*, Australia, December 20th, 1902.

(6) Address on Some Misconceptions with Regard to Diseases of the Liver, by W. Hale White.—*Brit. Med. Journ.*, March 7th, 1903.

Leprosy.

(1) Medical Notes in Ceylon, by Jonathan Hutchinson, *Polyclinic*, London. March, 1903.—Mr. Hutchinson contests the idea that there are no abortive cases of leprosy. A case he saw in Ceylon of twelve years' standing, with but few marked aggressive signs, renders it "quite possible that on closer scrutiny we may find a considerable number of cases of leprosy in which the disease has never developed itself fully." This observation serves to uphold a still closer resemblance between leprosy and curable cases of tuberculosis.

(2) Some General and Etiological Details Concerning Leprosy in the Sudan, by T. J. Tonkin. *Lepra*, vol. iii., fasc. 3, 1902. — The area of the Sudan affected by leprosy, according to Dr. Tonkin, is a

belt some five hundred miles wide, reaching from Darfur across Northern Nigeria, to the water-shed of the middle and upper waters of the Niger towards the south-west of Timbuctoo. Lepers were seen in every community, and in the larger towns they sit in rows and companies and inhabit market places in gangs and troops. Leontiasis is a less conspicuous feature of leprosy in warm than in cold climates, probably owing to the effect of variations of temperature in cold climates; in the Tropics, however, the feet, owing to the fact of their being more often bare, present more often leprous thickened than in the colder countries where shoes of necessity are worn. Dr. Tonkin holds that there is one great common factor in all leper fields, namely, a diet which is deficient in one specific direction, namely, nitrogenous material. He states that a largely vegetable, or, in other words, an a-nitrogenous food diminishes the resistance offered by the tissues of the body to disease, and thus favours the development of the leprous bacillus in the body.

(3) *Zur Pathologie und Pathogenese der Lepra Maculo-anæsthetics* [Pathology and Pathogenesis of Maculo-anæsthetic Leprosy], by Dr. V. Klingmüller.—*Lepra*, vol. iii., fasc. 3, 1902.

Malaria.

(1) *Du Paludisme à Forme typhoide* [Typhoid Form of Malaria], by A. Billet.—*Revue de Medecine*, Paris. Examination of the blood is the only decisive means of diagnosis, the presence of mononuclear hyperleucocytosis with excess of large mononuclear cells loaded with melanin being characteristic of malarial infection.

(2) Kidney Complications in Æstivo-Autumnal Fever, by I. B. Bartle.—*Memphis Med. Monthly*, Feb., 1903.

(3) Blood Examinations for the Malarial Parasites.—Thoroughly cleanse either a finger or the lobe of an ear of the patient with soap and water, ether and alcohol. After drying the part prick with a lancet and place a small drop of blood on a perfectly clean cover, then at once mount on a clean slip, blood side downwards, as a fresh preparation. The mounting should be accomplished as rapidly as possible. Thionin is a stain which gives good results, the process being as follows: Spread a thin film of blood on a clean cover-glass. Immerse it for one minute in 10 cc. of 95 per cent. alcohol, to which one drop of formalin is added at the time of using. Rinse the cover in water, dry between filter papers and stain for fifteen seconds in 50 per cent. alcohol saturated with thionin, 20 cc.; 2 per cent. solution of carbolic acid in distilled water, 100 cc. Wash off the surplus stain and dry between filter papers, then mount in balsam in the usual manner. It should be noted that intracellular clear bodies are present in all forms of malarial fever and the error should be avoided of taking the clear space caused by the biconcave form of the red blood corpuscle for the malarial organism. The tertian parasite, the ring and rosette, and various other forms, stain well by this method, and Jenner's stain is equally satisfactory.—*Journal of Applied Microscopy*, vol. vi., p. 2132.

(4) Congenital Malaria.—Yerburgh states that he examined the blood of infants the mothers of whom were suffering from malaria. In two cases he found that no plasmodia were present in the blood of the children, and therefore comes to the conclusion that only exceptionally are the plasmodia transmitted from mother to child. The number of examinations made, however, appear to be too small to justify the conclusions arrived at, the author, moreover, does not state how many blood tests he made. It is, however, interesting to note that these observations coincide with those of Bignami and Thayer.—*Geneesk. Tydschrift v. Nederl. Ind.*, No. 42, 1902.

(5) The Nomenclature of Malaria.—By David Bruce. *Brit. Med. Journ.*, January 3, 1903.

(6) Case of Puerperal Hyperpyrexia of Malarial Origin, by T. W. Clay.—*Brit. Med. Journ.*, January 31st, 1903.

Pellagra.

How to Prevent the Spread of Pellagra in Egypt, by F. M. Sandwith.—*Lancet*, March 14th, 1903.

Plague.

Prevention of Plague, by T. K. Tsukiyama.—*Sei-I-Kwai*, Tokio, Japan, December, 1902.—The main method of prophylaxis is the extermination of the rats.

Sleeping Sickness.

(1) In view of the recent expedition to Central Africa and the discoveries there made by Drs. Low and Castellani, in regard to the etiology of sleeping sickness, the following report by Dr. A. Broeden, published in the *Bullet. de l'Academie royale de Médicine de Belgique*, in 1901, may prove interesting.

The superintendent of the Bacteriological Laboratory in Leopoldville, on the Congo, examined six cadavers of negroes who had succumbed to the disease, and discovered that the blood and cerebrospinal fluid contained a new micro-organism which he proved by experiment to be pathogenic. This bacillus is 1 to 4 μ in length, 0·5 to 1 μ in breadth, with rounded ends; it is slightly motile, not ciliated, is facultatively anaërobic, with rapid spore formation. It grows on all the usual nutritive media, but the growth is slower in the temperature of the laboratory than in that of the incubator. It stains with aniline or after Gram's method.

The investigator found that the bat, goat, dog and mongoose, when injected with cultures, exhibited the symptoms of sleeping sickness as well as typical pathological and anatomical changes; the congestion of the pia mater was particularly marked, and agglomerations of the micro-organisms were observed in the substance of the brain and spinal column. The author states that he has actually located the same micro-organism in the air, water, and soil of Leopoldville.

(2) The Etiology of Sleeping Sickness (Preliminary Note), by A. Castellani.—*Lancet*, March 14th, 1903.

Spleen.

Hæmatemesis in Diseases of the Spleen, by Dr. C. Fedeli.—*Clinica Moderna*, January 7th, 1903. The

coincidence of hæmatemesis with splenic diseases is accounted for by Dr. Fedeli as being probably due to an infectious gastritis which precedes or accompanies the development of splenic disease. In the cases he records the enlargements were due to infectious causes, such as malaria and to splenic anæmia, and as the hæmatemesis came on during the process of enlargement of the spleen the two are possibly casually connected.

Tsetse Fly Disease, Nagana.

Recherches sur la Traitement et la Prevention du Nagana [Researches on the Treatment and Prevention of Nagana], by A. Laveran and F. Mesnil.—*Annales Pasteur*, Paris.

Yaws—Parangi.

Medical Notes in Ceylon, by Jonathan Hutchinson. *Polyclinic*, London, March, 1903.—Jonathan Hutchinson, during his visit to the East, describes cases of parangi which he observed in Ceylon. He is of opinion that these cases of parangi are yaws, or frambœsia tropica, and he maintains that the signs and symptoms of the patients he examined confirm him in the opinion that they are merely manifestations of syphilis. The belief prevalent in Ceylon and elsewhere that yaws is a disease met with only in inland or country districts, whilst syphilis is almost peculiar to towns, cannot in Mr. Hutchinson's opinion be maintained. He found no real clinical differences between the yaws of the country patients and the later manifestations of syphilis amongst town dwellers. The primary (yaws) sore in most of the patients he saw was on the leg or ankle. Mr. Hutchinson is confirmed in the belief that parangi is non-venereal syphilis, the poison being introduced by flies or through some accidental sore.

Plague.—Prevalence of the Disease.

India.—During the weeks ending February 14th and 21st, the number of deaths from plague in India were returned as 25,852 and 27,319 respectively. The rise was due to the increased mortality in Bombay City, Bengal, the Punjab, the Central Provinces and Berar. Since plague appeared in Poona in August, 1902, there have been 6,303 cases and 5,557 deaths from the disease in that City.

Egypt.—During the weeks ending February 7th, 15th, and 22nd, neither cases nor deaths from plague have occurred throughout Egypt. The last occurred at Tant-el-Gezireh on the 6th February.

Hong Kong.—During the week ending March 7th, 19 cases of plague were recorded in Hong Kong and 17 deaths from the disease; during the previous weeks the cases numbered 12 and the deaths 12.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

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4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—APRIL 1st, 1903.

Original Communications.

TROPICAL HYGIENE.

Lecture I.

The conditions which necessitate the Practice of a Special Application of Hygiene in the Tropics.

By W. J. Simpson, M.D., F.R.C.P.

The hygiene of the Tropics is the same in principle as the hygiene of colder climates, but the differences of climate, food, mode of life, environment and civilisation to be found in the Tropics modify to a considerable extent the conditions under which those principles have to be applied; consequently the practice of hygiene in the Tropics differs in many respects from that pursued in cold climates, and that which is suitable to the latter is not always suitable to the former.

Whilst, therefore, bearing in mind that the general principles of hygiene are the same wherever they are practised, it must always be remembered that they have to be adapted to the circumstances under which they are applied. This warning is not only needed for the Tropics where the conditions are so dissimilar to those of colder climates and consequently every variation is accentuated, but it is also required for colder climates, where the conditions of town as compared with hamlet and village are not the same. It is forgetfulness or non-recognition of the need of adaptation of the practice of hygiene to the varying conditions met with which accounts for the frequent failures in the application of its principles. For instance, because water-sealed traps, properly ventilated, are excellent appliances in English towns to keep gas from the sewers gaining access to the dwelling house, it has been assumed that such are useful for the Tropics, whereas, as a matter of fact, no water-sealed trap in the Tropics is safe because it is sure to be unsealed by evaporation in summer and by pressure through storms in the rainy season. Water closets inside the house are dangerous in the Tropics, while traps of the English type as appurtenances to water closets for a large population such as Bombay and other places are a costly failure. Again, in military operations in warm climates the Berkefeld and Pasteur-Chamberland filters have been advocated and used, but in a large number of instances the same results are not obtained as in England. The conditions under which they have to be employed in war and the Tropics are not the same as in civil life in England. Their application in South Africa and elsewhere to the filtration of water as practised in England was often a failure, not because the principle is wrong, but because in England they are used for clear waters, while in South Africa and elsewhere in warm climates they are most frequently employed for muddy waters, and this without any modification or adaptation of the filters to the different conditions for which they are required.

These two examples will serve to illustrate the importance of a consideration of hygiene in relation to the Tropics.

Tropical and Subtropical Regions.—The first consideration to which we shall direct our attention in these lectures is to what portion of the earth's surface do the terms tropical and subtropical apply? The zone within the Tropics or the Torrid zone is that belt or portion of the earth's surface which lies between the north and south parallels of 23° 28′ 40,″ the northern parallel being the Tropic of Cancer, the southern the Tropic of Capricorn. Between these parallels is the ecliptic, or apparent path of the sun, and accordingly over some part of this belt the sun is always vertical. In its apparent passage the sun travels between these parallels at an unequal pace, which is more rapid near the Equator than in the Tropics, and hence the duration of the vertical position in different parts of the belt varies. This variation

has an important bearing on the temperature, for, other things being equal, the longer any portion of the earth is exposed to the vertical rays of the sun the hotter it is. As the sun remains longest vertical or nearly so in the Tropics of Cancer and Capricorn, these regions attain the highest temperature.

The passage of the sun across the equinoctial and its alternate arrival in the northern and southern hemispheres bring about the seasonal changes in temperature, moisture and winds.

Beyond the belt of the zodiac there is a region extending to 35° latitude north and south which comes under the powerful influence of the sun on its approach to the Tropics and is generally included in that division of the globe possessing warm or subtropical climates, as distinguished from temperate and cold climates.

Climates.—Zones of climate are not co-terminal with zones of latitude. This is evidenced by the irregularity of lines and curves which are displayed on the charts of the world showing the annual isothermal lines or temperature lines in different places. The area in which the mean annual temperature of 80° F. occurs is very irregular in its outline; in some parts narrowing down to near the Equator, in other parts widening out to the extent of passing beyond the Tropic of Capricorn and Tropic of Cancer. On one side it extends from Africa well into the Pacific Ocean, and on the other to a large portion of Southern and Central America. Within the area of greatest heat are to be found certain localised centres in Central America, in Central Africa, in Central India, and in Northern Australia, whose annual mean is considerably higher than 80° F.

The irregularity of the isothermal curves is even more marked in the isothermal charts of January and July than in those of the mean of the year.

Regularity of the isotherms and their running parallel with the degrees of latitude could only occur if the earth's surface were uniform instead of presenting as it does every variety of irregular distribution of land and water, mountain and valley, barren soil and fertile plain, all with different powers of absorption and radiation of heat, and exposed to the influence of currents of water and winds. In consequence of these varying physical features, as well as the position of the sun, places with the same mean temperature do not always possess the same climates. Islands compared with continents possess different kinds of climates, though their mean temperature may be the same. The climate of the islands of the tropical seas is very different from that of North or South Africa or Northern India.

Humidity has a powerful effect in modifying and regulating the heat: when the relative aërial humidity is great it remains like a blanket over the land, preventing rapid evaporation and radiation, and hence the variations in temperature are small and the climate is equable; on the other hand, when the relative humidity is low and the atmosphere is dry, evaporation and radiation proceed rapidly, and the soils most absorbent of heat during the day cool rapidly at night and the climate is subject to great diurnal fluctuations.

It is because of the abundance of rain and the amount of watery vapour in the equatorial regions that the temperature, though high all the year round, never reaches those extremes which are found further away from the Equator and in drier regions.

The Distribution of Rain, therefore, is an important factor in the formation of climates. In warm regions the heaviest rainfalls are on the islands on or near the Equator, certain coast-lines in the equatorial and tropical regions, and a few highlands within the Tropics; the lightest rainfalls are on the plateaux and inland regions lying on the leeside of mountain ranges; and there is the vast rainless tract which forms a more or less continuous belt of desert separating the torrid zone from the temperate zone.

From the distribution of rain and the distance of the locality from the Equator a fair conception may be formed of the general character of the climate and seasons, although it must be borne in mind that local conditions, such as soil, elevation, exposure to winds and maritime or inland positions, effect important changes and cause variations. Generally it may be stated that where rain and moisture are abundant the climate is not excessively hot, but steamy, damp and oppressive, and the range of temperature is limited. Where the rainfall is scanty the climate is intensely hot and dry in summer, and the range of temperature is large. Between these is every variety approximately more or less to one or the other. The parts of the earth which attain the greatest heat are in or near the Tropics, and they are the driest regions.

Rain within the torrid zone is a much more decided affair than elsewhere. There are no drizzling rains such as are to be met with in England and Scotland, but the showers, however short or long in duration they may be, are heavy. It is this feature of the rainfall which, unless the ground is very porous or has natural advantages in slope, favours floods, inundations and the formation of swamps which require special contrivances and drainage for their prevention. The rain, besides coming down in heavy showers, falls, except on the Equator, more periodically and regularly than in other parts of the world. On the Equator it may fall at any time. From 5° to 10° from the Equator, rain falls when the sun is in the zenith and approaching the Tropics and again on its return towards the Equator, so that there are two rainy seasons. In those regions further away from the Equator there is only one rainy season during the year. In Ceylon, for example, the rainy season is in May and June with the S.W. monsoon, and again in October and November with the N.E. monsoon. Rain, however, falls in every month. In India the rainy season is chiefly regulated by the monsoons, which is the name given to the predominant winds. From October to March the N.E. monsoon prevails, it is a cool and dry wind, having passed over vast tracts of land. From April to October the south-west wind predominates. It is a hot wind charged with moisture from the southern seas, and for three or four months in the year brings rain to the greater part of India. When the sun is vertical in the northern hemisphere, there is a gradual heating up of the land until it becomes like a fiery furnace. With this intense heat the barometric pressure is gradually lowered, and air currents from the southern seas rush into the vacuum, preserving in the main a S.W. direc-

tion. Laden with moisture, this S.W. monsoon, when it strikes on high land, as on the Western Ghauts, on the Malabar Coast, on the Mountains of Tenasserim and on the Mountains of the Himalayas, where it meets with colder air, deposits its moisture in the form of heavy rain, reaching as much as 121 inches at Cannemore (Malabar), 253 inches at Mahbleshwar, 180 inches at Moulmein (Tennasserim), and 600 inches at Cherrapunji (Khasyah Hills).

Having lost much of its moisture in its passage over these highlands, the inland districts may be comparatively dry. Or even in places near the sea where there are no high lands, the rainfall may be small, as at Karrachi.

The Effect of Climate on Vegetation.—Climate expresses itself so strongly on the vegetation in the Tropics that it is easy from the vegetation of the locality to form an opinion of the kind of climate possessed by the locality. Where the vegetation displays an endless variety of plant life unknown to Europe, decked in gorgeous colours and reproducing itself in the most luxuriant growths, the climate is sure to be hot and moist. It betokens perennial warmth, great moisture and equable seasons. It is under these conditions that Nature is prodigal of her richest productions, and it is with difficulty that vegetation can be kept within limits. If a locality or village be deserted for a time, such is the rapidity with which grass, creeper and jungle grow, that the site will soon be hidden. Where the vegetation is less luxuriant but of the same tropical nature, the climate will be hot but with plenty of rain, and in those regions where the heat is strong but the rain fails, the vegetation fails also, and the land approaches the appearance of a desert.

The Luxuriance in Plant Life in the Tropics extends also to the lower forms of Vegetable Life.—Putrefaction and fermentation proceed with more rapidity in warm climates than in others, and especially is this the case in hot and humid climates. It is under these conditions that the microscopic agents which Nature uses in her laboratory can work best in disintegrating dead matter, and convert the organic into the inorganic. But during the process, and until the work is complete, there is the possibility of compounds being formed or the agents themselves acquiring properties hostile and dangerous to man. Similar processes go on in cold climates, but not with the same energy or rapidity of development. That which proves to be hurtful in Europe is doubly so in the regions we are dealing with. The same meteorological factors favour the development of germs and parasites which give rise to diseases almost peculiar to the climates. There is a climatic or geographical distribution of parasites, and with this a corresponding geographical distribution of disease. For instance, there are endemic areas for yellow fever in South America, the West Indies, and on the West coast of Africa; for cholera in the Delta of the Ganges; for beri-beri in Brazil, Malayan Archipelago, China and Japan; for filariasis in South America, West and East Africa, India and China; for guinea worm, bilharzia hæmatobia and dysentery in nearly every part of the Tropics; parasite and disease thrive best in these endemic or home areas, finding in them congenial conditions for their development, just as plants and different races of men thrive best in their original homes. Both may occasionally swarm over the boundaries of their natural home, but they encounter difficulties in becoming acclimatised, reproducing themselves and thriving in their pristine vigour in regions widely different from that in which they were nurtured, and in the struggle they usually lose their qualities, or die, or become absorbed into the type.

The effect of Insanitary Conditions frequently attributed to Climate.—It will be seen, therefore, that immediately a European enters the Tropics he comes under the influence of a new environment which is destined to impress itself on him, though not in the manner that was understood in the early part of the century, when every illness which occurred in warm climates was attributed to climatic causes, instead of—as in the majority of cases—to the most flagrant breach of sanitary laws. This was particularly the case in the West Indies, where the mortality amongst European soldiers was the highest recorded anywhere. Fever, scorbutic dysentery and phthisis were extraordinarily prevalent, and it was estimated that the life-time of a regiment 1,000 strong was about five years. This mortality occurred under the following conditions: The food of the soldiers consisted mainly of salted meat with but a scanty supply of fresh vegetables, the drinking water was taken from polluted sources, the barracks, built on unhealthy sites, were badly constructed, without ventilation, and were overcrowded, the cubic space for each man being about 250 feet; the sanitary arrangements were foul and neglected and of the most primitive character. Add to these over-eating, intemperance in drink, unsuitable clothing and no exercise, and there is a ready explanation of the great mortality without blaming the climate. The mortality in the twenty years from 1817 to 1836 was in Jamaica 121 per 1,000, in Trinidad 106, in Barbadoes 55, in St. Lucia 122. When the conditions mentioned were improved a steady decline took place in the death-rate, which has fallen more than ten times. Scorbutic dysentery has disappeared with the introduction of fresh meat and vegetables and pure water; phthisis has been greatly reduced by better ventilation and less crowding of the barracks, and the general mortality is not more than that in England among the troops stationed there.

A similar change has taken place in the European troops in India. In the early part of our occupation the death-rate was 80 per 1,000 among the troops, even as late as 1858 it was 69 per 1,000. This has been altered, and, by the introduction of sanitary measures and attention to the diet, drink, clothing and exercise of the soldier, the death-rate is now less than 16 per 1,000.

The same decrease in mortality has happened in the European civil population with a better understanding of the mode of life to be followed in the Tropics. In Calcutta, for instance, in the early days, the principal inhabitants used to meet under a tree on the Maiday and congratulate one another that they had escaped alive through the rains. Now, for Europeans Calcutta is in many respects as healthy to reside in as towns at home.

The West Coast of Africa was also in the early

part of the century the white man's grave, the mortality from 1817 to 1837 in Sierra Leone being 170 per 1,000. In the 'sixties this rate came down to 80 per 1,000, and it has declined still further, and though the towns on the West Coast of Africa have still a most excessive death-rate, there can be little doubt that by the systematic adoption of the same hygienic measures as those that have proved so successful in the West Indies and in India, the mortality will decline.

Under the condition of bad hygiene, personal and general, it is difficult to adjudge the proportion of ill-health due to climate and to preventable causes, but when experience shows that by the removal of insanitary conditions and placing the individual under favourable hygiene the mortality which used to be ascribed to climate can be reduced ten to fifteen times its former rate in the West Indies, and at least five times its former rate in India, the question arises whether, apart from inattention to personal hygiene, insanitary conditions and malaria, residence in the Tropics is more unhealthy to a European adult than residence in his own country. Whatever answer may be given to this question, it is certain that in the vast majority of cases residence for a short time in the Tropics does no harm.

(*To be continued.*)

ROYAL INSTITUTE OF PUBLIC HEALTH CONGRESS AT LIVERPOOL.

Lt.-Col. A. CROMBIE, C.B., I.M.S., (retired) member of the Medical Board, India Office, has been nominated to attend the Congress in July, 1903, as Delegate for India.

NOTES ON THE COMMON DISEASES AFFECTING INDIAN LASCARS AND OTHERS. By Thomas L. Bonnar.

The author, under the above heading, mentions (1) *Parasitic diseases*, the origin of which is probably due to invasion by the ova of Ankylostoma duodenale; the sites usually first attacked are the buttocks, lower extremities, toes, and dorsum of the feet. (2) *Dysentery*, common in overcrowded and ill-ventilated abodes, is of an infective nature; persons once atttacked are liable to have recurrences, which lead to a condition of chronic dysentery; pyæmic abscesses of the liver are serious complications. (3) *Ringworm* is common among lascars and other seafaring persons, the location being principally the arm-pit, scrotum, buttocks and between the toes. (4) *Boils* are very troublesome and very infective, but a crop can be prevented by the prompt application of sol. arg. nitras, or acid carbolic, at the initial stage. (5) *Loose cartilage* of the knee is frequent and is favoured and aggravated by walking on changing planes, as is the case on rolling ships' decks. (6) *Ulceration of the gums and enlarged glands with fever* are not infrequent among lascars, and have no connection with plague. (7) *Influenza* is not at all rare, but seafaring persons rapidly recover under the influence of the bracing sea-air. Pneumonic complications and syncope, however, have to be guarded against.—*Ind. Med. Rec.*, December 24th, 1902.

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THE

Journal of Tropical Medicine

APRIL 1, 1903.

TROPICAL LIFE AS IT AFFECTS LIFE ASSURANCE.

THE vexed question of life assurance in the tropics, the extra premium charged, and the area of danger specified by the life-assurance offices, was dealt with recently at a meeting of the Life Assurance Medical Officers' Association in London. The one fact made evident to every one present at the meeting was that there is no information available to draw conclusions from or on which to build up reliable, or even approximately reliable, statistics.

To our Crown colonies and protectorates young men go out from Britain in the prime of life, and, for the most part, after being carefully inspected medically. When they get ill they may be "invalided home" or seek change of climate locally. Again, the most serious illness in tropical countries, namely, malaria, incapacitates more

often than it kills, and the meaning of the death-rate returns of Europeans in the tropics cannot be gauged by the actuary who compounds his tables on information based on vital statistics collected in Britain. Even the carefully-compiled returns in Indian Army reports do not help us much, if at all, in arriving at a conclusion of any value.

Who drew up the present rules that most insurance offices affect is a mystery; they were, most certainly, not the work of experienced medical men; and if by actuaries, then they may truly be said to have been drawn up "on general principles;" for there never existed, nor does there now exist, any reliable, or even approximately reliable, figures on which to ground an opinion. If by neither of these, therefore, on what are the extra premium charges founded? There can be no doubt they were based on the most unreliable of all information, namely, gossip; or on the tittle-tattle of the old-time ship captain, who mostly gained his information from frequenters of river-side wharves or polluted harbours. It may be, however, impossible to individualise too closely, and perhaps the insurance offices are justified in the main. Most offices, however, declare "that they deal with each case individually," yet the "dangerous" area exists in their prospectuses. If each case is to be dealt with individually, it would be but logical that the 33° N. and 30° S. limits ought to be withdrawn. The two statements are at variance.

Many of our large insurance offices tell us that they do not care to insure men going abroad to our colonies and dependencies. The business they desire is local, and most of them look askance at "lives" dwelling out of the British Isles. We do not consider this—what shall we say?—patriotic (for want of a better word). Of course business men in insurance offices will scout any such idea as being chimerical, even quixotic; they hold that they are private companies doing their best for their shareholders, and patriotism has no part in their dealings. Like the shipping companies, they will sell their rights to benefit the shareholders, even if the ships are lost to the flag; or, in the case of the insurance office, the money passes into other pockets. In this we cannot altogether blame them, but surely the insurance companies of the country owe a certain duty to the State. They are allowed to accumulate vast sums of public money, and the State has a right to know that they are acting in the interests of the people. We are an Empire of scattered units, and the communication becomes more intimate year by year. Business firms of any pretensions have their branches—or ought to have, if the foreigner is to be kept out—in some one or in several of our colonies. Intercourse with our colonies is the essence of Imperialism, and everything possible should be done to foster it. How, then, do these great public bodies, to whom so much of the Nation's money is entrusted, play their part? One company, with the word "Colonial" prominent in the name of the firm, states that it "does not encourage insurance business with men proceeding to our colonies." Another of the largest of our companies makes a similar assertion; and all, except a very few, look askance at business with persons proceeding abroad. This is a serious reflection on any British Insurance Company. If the insurance companies are to take their place in the imperial work before us, they must cease to be parochial in their notions and to remember that the State, having allowed them to accumulate a large part of the national wealth, requires of them national work. What is the consequence of their desire to "ca' canny"? The American companies step in. Soon after an uninsured Britisher sets foot in a colony, the omnipresent American insurance agent makes overtures, and more often than not secures a policy. The money goes to swell American coffers, and the British office—that is, Britain—is left all the poorer. And all this for what reason? Because British insurance offices have based their opinions as to the danger of modern life in the tropics on "gossip" of fifty years ago, and they affect to believe in dangerous and unhealthy areas of the globe on insufficient evidence.

Correspondence.

From "The Lancet," March 28, 1903.

PROFESSOR GRASSI'S RECENT PAMPHLET.

SIRS,—Professor Grassi has recently published a pamphlet entitled *Documenti riguardanti la storia della scoperta del modo di trasmissione della malaria umana*, which I find he has dedicated to me. The work is of a polemical character. Lest from the fact of the pamphlet being dedicated to me it might be supposed that I indorse the views therein expressed, I beg to say that in many instances I do not, and, moreover, that I was not consulted about the dedication.

Queen Anne Street, W. Yours truly,
March 20, 1903. PATRICK MANSON.

Translation.

CLINICAL AND PATHOGICAL OBSERVATIONS ON BILHARZIAL DISEASE.

By Dr. CARL GOEBEL.

Translated from the German by P. Falcke.

Archiv für Schiffs und Tropen Hygiene, 1903, No. 3.

THE region of distribution of the trematode called bilharzia hæmatobium (Cobbold) undoubtedly includes the German West African colonies.

Various British medical men have reported the disease in the Cape,[1] in Natal,[2] along the Zambesi, on Lake Nyassa and from the Gold Coast,[3] nevertheless I do not know a single publication from German Colonies that mentions the occurrence of the disease. Nachtigall, alone, according to Sonsino, reports hæmaturia as occurring in the neighbourhood of Lake Tschad, but he does not allude to bilharzia. I may therefore be permitted to endeavour to arouse some interest in bilharzial disease in our (German) Colonial circle by publishing the experience gained in Egypt during my four years' practice there.

The disease is caused on the one hand by the adult worms which live in the abdominal veins, more particularly in the uropoietic viscera and on the other hand by the ova of these worms, which tend to become scattered throughout the whole body. The deposit of these as emboli induces slight lesions of the internal organs. Kartulis[4] demonstrated ova in the liver, kidneys, lungs, intestine, &c. We must, however, note that Kartulis is of opinion that the ova are deposited by the worms in the situations in which they are found, and have therefore not been carried there as emboli. Griesinger found eggs and empty egg shells in the blood within the heart. According to Kartulis the spleen, stomach and pancreas alone are free, but it may be only an accidental occurrence that he found no eggs in these organs. I was able to demonstrate eggs in the pancreas of a fellah who died of cancer of the bladder and bilharzia, and I likewise found eggs in the contents of the stomach of a boy aged 12, with gastric fistula following tubercular peritonitis.

The ova in the liver are mostly situated in the acini, surrounded by a small-celled centre of infiltration. I also occasionally found circumscribed centres of connective tissue in the liver, measuring about 1 cm. in diameter and of a round or oblong shape. These centres consist of connective tissue, ova and proliferated biliary ducts. It is uncertain whether such a form of nutmeg liver is characteristic of bilharzia. I could only demonstrate these areas in the granulation tissue of the pelvis of the kidney in pyelonephritis, not in the actual renal substance.

Bilharzial disease only occasions really severe lesions in the urinary and intestinal system. A mass of literature has been published by the discoverers of the disease, Bilharz and Griesinger, relative to the changes in these organs. Scheube, in his *handbook on the diseases of warm countries*, furnishes a good description of the disease. I cannot refrain from citing Griesinger's classical description.[5]

"The simplest, slightest and first changes in the vesicle mucous membrane consist of spots of hyperæmia, which are sometimes sharply outlined, and sometimes somewhat obliterated at the borders; there are many small extravasations of blood, the mucous membrane at such places being somewhat swollen or puffy, and often, but not always, coated with viscid mucous, or with a copious greyish-yellow, or sanguineous exudation; quantities of the ova of the distomum are found in these discharges. In isolated cases the entire mucous membrane of the bladder exhibits marked injection and ecchymosis; in the great majority of the cases the process is limited to small spots varying in size from a lentil to a sixpenny-piece, particularly on the posterior wall of the bladder. In a great many cases—at a later stage of the disease—greyish-yellow, yellowish, or dull white elevations of the mucous membrane, mingled with many spots of pigment, are found; there are occasionally smooth, leather-like coatings beneath the mucous membrane, that appear as if they had lain in spirits of wine; sometimes, however, the coating is friable, presenting a fine *débris* and yet very adherent. In many cases the coating is permeated with urinary salts, or a firm sand consisting of eggs, or egg-shells. On trying to remove these patches it is found impossible, without peeling off the outer layer of mucous membrane as well. The patches are occasionally very soft and friable, and partly mixed with extravasated blood. In isolated cases only dirty red, grey, or black raised spots of pigment are found in the otherwise unchanged mucous membrane, or in addition to fresh injection and congestion. In one case only, in a mucous membrane beset with many fresh ecchymoses, there was discovered a deep loss of mucous membrane the size of a sixpenny piece, presenting an ulceration situated beneath a coating thickly encrusted with urinary salts."

"All these changes are attributable to extravasation and to a process of inflammation set up by the distoma invading the smaller branches of the vessels, and there

[1] Harley, Med. Chir. Trans., publ. by the Royal Med. Chir. Soc. of London, 1864 und 1869, *Brit. Med. Journ*., 1870, *Lancet*, 1870.

[2] Childe, *Brit. Med. Journ.*, Sept. 9, 1899.

[3] Eyles, *Lancet*, 1887, vol. ii.

[4] *Virchow's Archiv*, vol. clii., 1898.

[5] Clinical and anatomical observations on the diseases of Egypt. *Arch. f. Physiol. Heilkunde*, 1854.

depositing their eggs, and the subsequent protrusion of the eggs from the torn vessels."

"In many cases, however, appearances are quite different. On the vesical mucous membrane there are single or heaped up excrescences or vegetations, they vary in size from a pea to a bean, and are yellowish, or of a sanguineous ecchymosed appearance; they are slightly raised, wart-shaped or fungoid, the top split, resembling condylomata or shaped like a cock's comb or raspberry, the base being somewhat constricted. As a rule their condition is such that the mucous membrane over them is unchanged, being only somewhat thicker and perhaps the lower stratum somewhat more adherent than in the normal. Sometimes they appear to be injected dark red throughout, and the body of the prominence is formed of the swollen submucous tissue, which is then soft, yellowish-brown, brittle, or marrow-like, or it may be firmed with a fleshy infiltration or entirely permeated with coagulated blood or pigment. . . . There are innumerable transitions from flattened and sessile patches to elevated and fungoid-looking protrusions. The muscular coat of the bladder is very rarely changed even in advanced stages, although it may be slightly hypertrophied, and once did the peritoneum covering the bladder exhibit dark pigmented excrescences of cock's comb shape."

"Dr. Bilharz was able to extract the distoma from the sub-mucous tissue that forms the excrescences; they lay in smooth walled spaces which communicated with the blood vessels."

"In numerous cases the mucous membrane of the ureters, occasionally independently of the bladder, exhibits the same changes which in very rare cases occur in the pelvis of the kidney also. In the ureters the diseased areas usually consists of irregular, island-like, yellowish-grey, slightly elevated spots, which are formed of a soft, but always adherent coating. As a rule it is sandy to the touch, and frequently contains a quantity of dark gravel with a number of ova. In this situation the changed mucous surface causes more serious consequences than is the case in the bladder. The agglomeration in the mucous membrane, and the frequent thickening of the sub-mucous layer causes stricture of the ureter, with fusiform or cyst-like dilatation of the canal, hypertrophy of the muscles, retention of the urine, &c. . . . In several cases the mucous membrane of the ureter was beset with numerous cysts varying in size from a millet to a hemp seed."

Thus Griesinger expresses himself. More recent observers have only enlarged on his statements, they have never been able to improve upon his description. One fact has been lately neglected, namely the presence of the *living worms in the wall of the bladder.* Thurn[6] only casually mentions the circumstance and states that possibly the formation of the excrescences may be specially ascribed to the presence of the worms. Kartulis observed them three times whilst examining sections of the bladder.

Most authors appear to be under the impression that the fecundated females are only temporarily present in the veins of the bladder and rectum in order to deposit their eggs. This view causes misrepresentations. Thus Belleli is of opinion that the veins become filled with the eggs of the worms, and the eggs being unable, on account of their size, to invade the capillaries, burst the veins and the eggs thus attain the surrounding tissues. But as a rule, the circulation is from the capillaries into the veins, so that the ova are driven in that direction, and therefore reach the larger venous trunks, not the capillaries.[7]

I was three times successful in microscopically demonstrating worms in the tissue, once in a rectal polypus, once in polypi of the descending colon and its flexure, and the third time in the vesical mucous membrane. In my opinion, the probabilities are that the worms for the most part do not lie in the veins but in actual newly formed venous recesses, which lack a distinct endothelium, and only exceptionally contain traces of blood-corpuscles. These cavities are therefore to be regarded as either newly formed cysts or as dilated lymph spaces. Such a condition, according to analogy with other human parasites (for instance the trichina) is not abnormal. In another case I found a worm in outgrowths from the intestinal peritoneum. In this case, it is evident the worm had attained the free abdominal cavity and was here confined in a fibrous enclosure, together with the eggs, each of which possessed a definite concentric shell; macroscopically, the appearance was that of a miliary tubercle.

I also find the ova in the bladder and the intestine as well as in the peritoneum outside the blood vessels.

Only once did I observe three or four eggs surrounded by a distinct endothelial coating which blocked up the lumen of the vessels. The vessel itself resembled a small vein rather than a large lymph trunk (Chaker, *Thèse de Paris*, 1890, on the other hand observes: La lumière des vaisseaux est souvent obliterée par des œufs accumulés.)

The eggs are almost exclusively found free in the tissue, either without producing changes therein, or they are surrounded by a larger or smaller small-celled infiltration.[8]

The eggs are frequently observed lying in rows, proving that they are present in tissue channels (lymph spaces?) To confirm this view there are illustrations that exhibit the eggs either lying arranged in rows or in a circle almost or entirely closed (according to the direction of the section) in the peri-adventitial lymph spaces of a large vessel. Further confirmation is furnished by the occurrence of eggs in the glands, more especially the mesenteric glands, where Zancarol first found them and where I have frequently come across them in bilharzial polypi of the large intestine.[9]

How the Ova Reach the Tissues.

It is puzzling at the first glance to discover how the eggs get into the tissues. If it were really through

[6] *Wiener mediz. Blätter*, 18[illegible], Nos. 41 and 42.

[7] See also Lortet and Vialleton, *Ann. de l'Univ. de Lyon*, x., 1, 1894.

[8] Rütimeyer says of the ova in the ureters that "they are nowhere distinctly demonstrable as endo-vascular." Of the ova in the bladder he remarks: "that the majority of them lie free in granulation tissue and in the epithelium of the mucous membrane.

[9] See also Kartulis.

the bursting of veins which, as mentioned above, is highly improbable, we should find hæmorrhages within the tissues, or we should expect to see traces in the form of pigmentation; these are, however, entirely absent. Of course I do not reckon the superficial hæmorrhages when the eggs invade the cavities of the bladder or intestine. These hæmorrhages are clearly explained by the rupture of capillaries, and the effects of the contraction of the muscles on the diseased mucous membranes. I consider the opinion expressed by some authors, that the female worms attain the superficial veins of the bladder and rectum from an instinct that the eggs there deposited by them would thus be most easily evacuated, to be untenable.[10] The structure of the parasite contradicts this view, for it would be impossible for the female to advance against the course of the circulation to the periphery. Moreover all the bilharzia which I have found in the bladder and intestine in sections, or which I have met with during operations, were always in pairs, copulating.

A minute examination of the blood and of the bilharzial tumours of the bladder immediately after operation, almost always reveals a larger or small number of *copulating* worms.[11]

Changes in the Blood.

This examination is sometimes rendered difficult by the pronounced tendency of the blood of bilharzial patients to coagulate quickly, a fact observed at operations as well as at autopsies. It is not known if this is caused by the secretion by the parasites of some material inducing coagulation. Zoologists, amongst them Professor Looss, deny that bilharzia worms, like anchylostoma duodenale, produce a virus that alters the blood. In any case the advanced anæmia that is present in those suffering from an invasion of anchylostoma, is absent in bilharzial disease. Is it not, however, possible that, in the excretions of the worms there is a material that alters the blood and perhaps even favours the formation of fibrin? That they void a quantity of excretion appears to me highly probable, and the occurrence of amorphous pigment-like masses, found in cavities in which the worms are still present or have previously lain, pressed in crescent form against the wall, seems to confirm this. These amorphous masses are not blood pigment for they do not give the iron reaction. In sections of vessels, also, such flakes are observed, about twice the size of a blood corpuscle. Formerly I looked on this as pollutions but must now advance the above-named hypothesis. The worms themselves in section exhibit the small black masses in their intestinal canal or body cavities.

To return to the original subject, it appears most probable that the eggs deposited by the female, either in the bladder or intestine, are carried by the lymph stream into the tissues and then perhaps partly transferred as emboli from the vessels to other organs.

The eggs in the tissues are partly fresh, containing living embryos, and partly old, the contents having perished or become calcified. On the other hand, the eggshell only may be found; it is recognisable by being armed with a spine characteristic of the bilharzial ovum; the spine is mostly situated laterally when met with in ova in the intestine, but at one end when in the uropœtic system.

On staining preparations with hæmotoxylin it will be observed that in dead eggs a metachromasia sets in, such eggs becoming stained a more or less marked violet colour, whilst the fresh eggs, like other tissues, appear blue.

In regard to the secondary conditions caused by these eggs, I cannot do better than again refer to the Griesinger. In regard to the uropoietic system, they consist of cystitis, infiltration of the sub-mucous tissue, the formation of tumours either in the form of Griesinger's patches or actual polypi, in stone formation and perineal fistula, or urethritis, inflammation of ureters, pyelonephritis, with all their sequelæ (uræmia, septicæmia). In the intestine, simple catarrh leading to the formation of ulcerations and more or less pronounced development of polypi are found, mostly in the rectum, but also sometimes as far up as the transverse colon. There is also sometimes infiltration of the connective tissue bordering on the intestine and the formation of extensive inflammatory mesenteric thickening.

The microscopical examination of the vesical mucous membrane in bilharzial cystitis, with or without formation of stone, exhibits a more or less severe infiltration of the submucous connective tissue through eggs, which are frequently surrounded by small-celled infiltration. There is also a more or less pronounced flattening of the epithelium, or it is completely denuded and the bare surface replaced by a stratum of detritus that sometimes covers the epithelium that remains. In other cases, again, there is proliferation of the epithelium which assumes a more or less cylindrical shape, even assuming the form of ramified tubes simulating the appearance in endometritis. When in these cases the submucous connective tissue is also proliferated the epithelium rises somewhat above the superficial area between two or several many-branched cylinders, and the appearance of a polypoid formation results.

The polypi themselves, which are situated principally within the meatus urinarius, are of various sizes, mostly as large as a hazel nut, but incidentally become large enough to fill the bladder.

Microscopically they are found to consist of connective tissue, with a few or many eggs (sometimes none are found) and they have an epithelial covering which exhibits the same peculiarities as the entire bladder in bilharzia. Occasionally epithelial rods permeate the connective tissue in various directions, showing tubular glands with cylindrical epithelium so that the appearance is more that of an intestinal polypus than a vesical polypus.

Larger tumours and proliferations which, up to the size of a walnut may extend into the bladder with a relatively smooth mucous membrane covering, are essentially always formations of the submucous tissue; they consist of interstitial tissue, which macroscopically and microscopically exhibits a more or less sarcomatous character.

[10] See Lortet and Vialleton.

[11] Madden, *Egypt. Med.*, 1902, February 15, No. 8.

In regard to these tumours, the occurrence and the relation of bilharzial disease to actual sarcoma and carcinoma, no definite conclusions have been arrived at, so that I will only here mention that the simultaneous presence of the two diseases is not uncommon and renders the prognosis of bilharzia doubtful.

In bilharzia the formation of fistula are of clinical importance. We have to differentiate suprapubic, perineal, and scrotal fistulæ, and fistulæ of the penis, also fistulæ on the thigh and the nates. Hitherto I have only observed one case of suprapubic fistula. The miserable fellah, the subject of it, had a fistula 3 cm. above the root of the penis, it was about 8 cm. in breadth with protruding borders; a fistulous tract led beneath the skin up to the navel. Pus and urine were secreted from the fistula. Nearly the whole bladder was taken up by masses of tumours which, however, did not include the trigonum vesicae. The microscopical examination confirmed carcinoma and bilharzial disease. Strictly speaking, therefore, this fistulous formation cannot be included with pure bilharzial fistulæ.

It is different with perineal fistulæ. The statistics of the cases of bilharzia observed in my hospital show how frequent they are. Between the years 1890 to 1901, 1,684 cases of bilharzia were admitted for treatment or, if we omit the doubtful cases, 1,449; of these 266 had fistulæ, being 18·45 per cent. Trekaki and v. Tichstorff[12] give their number as 40 per cent., but their statistics are too few, only extending over two years.

Belleli conjectures that the fistulæ ensue in consequence of infiltration of the perineal tissue and its subsequent suppuration and breaking down exteriorly towards the skin and into the urethra. This is not in accordance with my experience, for almost always the primary causes are cystitis and urethritis with the formation of granulations and processes of suppuration. There is very often great stiffness and inflammatory painfulness of the entire penis as far as the urethral orifice, and a secretion from the latter as in gonorrhœa, so that the suspicion of this condition is only settled by microscopical examination. The cicatrised callous material which surrounds the fistulæ grows so quickly that it forms unmistakable fibroid tumours, which render walking difficult for the sufferers.

A urethral stricture is often combined with the fistulæ; not a callous stricture, like that following gonorrhœa, but a soft one produced by masses of granulation of the urethra; it never tends to complete closure, but urination is so far retarded that the catheter has to be brought into requisition to avoid retention of urine; the catheter, also, may sometimes miss its mark.[13] This form of stricture is, however, frequently found without a fistula and incidentally leads to dilatation of the prostatic portion of the urethra around the seminal orifices furnishing a further impediment to the use of the catheter, which is baulked at the valve-like opening into the bladder.

The changes in the intestine are equally as manifold as those in the urinary system. At times the microscope[14] discloses eggs in the connective tissue between the intestinal glands and in the sub-mucous connective tissue, without macroscopical changes being visible. Such intestinal sections are remarkable through the blackish pigmentation. It may be observed also that such microscopical conditions are also found in the small intestine by me, in contradistinction to most observers.

Naked-eye changes are only found in the large intestine, and there most frequently in the descending colon, sigmoid flexure and rectum. These changes are well known and have been described as ulcerative, polypoid, or submucous tumours (similar to those met with in the bladder[15]), so I need only mention symptoms that are less frequent and less likely to meet the eye. I must direct attention first to the simple bilharzial catarrh of the rectum in which a greyish white, viscid, cream-like secretion, containing an enormous number of eggs, is produced from a very red painful mucous membrane that bleeds easily. Secondly, I may mention a thickening of the sigmoid flexure and the lowest part of the colon, which is originated by the infiltration of the intestinal wall and the contiguous connective tissue. In milder cases the still movable but painful intestine may be felt in the left iliac fossa like a long hard sausage; in severer cases there are thick proliferations caused by infiltration of the mesentery up to its attachment.[16] In one such case the above-mentioned tubercles were on the serous membrane of the intestine and the tubercles were seen to consist of worms and eggs embedded in fibrous tissue.

(*To be continued.*)

[12] *Annales des mal. gén. urin.*, September, 1896.

[13] Allen, *Practitioner*, 1888, April, No. 238.

[14] In contradiction to Damaschino (*Gaz. hebd. de méd.*, 1882 p. 365), I may state that the long axis of the eggs absolutely does not lie parallel with the surface of the intestine; the contrary position indeed being most frequent.

[15] Amongst others referred to by Madden.

[16] Madden likewise described such a case in the JOURNAL OF TROPICAL MEDICINE, May 1st, 1901. Chaker also mentions that he found eggs in the "tissu adipeux sous-séreux," a location that is denied by many investigators.

Reprint.

ON HEAT STROKE.

By ANDREW DUNCAN, M.D., B.S.LOND., F.R.C.S., M.R.C.P

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To those who have chosen a career in the tropics, the subject of heat stroke is one of importance. Recurrent attacks are so highly probable, that the continuance of a tropical life may be rendered impossible. The especial object of this paper is to indicate a means of prophylaxis, which, in my own case, I have found exceedingly efficient.

CLINICAL VARIETIES OF HEAT STROKE.

The sun's rays may affect an individual in various ways. The subject will, I think, be best considered under the headings of :—(*A*) HEAT COLLAPSE; (*B*)

Heat Stroke—(*a*) *Direct heat stroke, or sunstroke proper;* (*b*) *indirect heat stroke.*

(*A*) Heat Collapse.—Here the patient suddenly turns giddy and falls. The skin is moist and cool, the breathing hurried but never stertorous, the pulse small and soft, the pupils dilated, and the temperature at or below the normal: there is no complete loss of consciousness, as a rule, and recovery generally occurs.

(*B*) Heat Stroke.—(*a*) *Direct heat stroke or sunstroke.*—There are several forms of this variety. *In one*, the victims are mostly unaccustomed to the fatigues of marching, and it is especially liable to affect them when the air is moist, so that the skin action becomes diminished. Violent headache is first complained of, and oppression: the march is nevertheless continued, and the patient next falls in convulsions. The teeth are firmly closed, insensibility is absolute, respiration difficult, pulse small and irregular, and often incontinence of urine occurs. *In another*, the subject streams with sweat, becomes progressively paler, the lips are cyanosed, the veins swollen, the eyes injected, and the respiration shallow and quick, until he falls to the ground. Consciousness is not, generally, entirely lost, and revival occurs if the patient be laid down and relieved of all impediment to free respiration. *In a third case*, no fatigue is complained of, but the patient is thirsty, and suddenly falls forward comatose. The state of coma may last twenty-four to thirty-six hours, and may end in death without recovery of consciousness. *In a fourth variety*, after a hot and wearying march in the sun, the subject is seized with a racking headache. This hourly becomes more and more intense, so that within twenty-four hours he may be rolling about in agony from the terrific pain in the head. Soon great intolerance of light occurs, and, after perhaps forty-eight hours, unconsciousness sets in. Should the patient not die, the intense pain in the head may last for six to eight weeks, unrelieved by any drug, with the exception of slight evening remissions. It then gradually abates.

(*b*) *Indirect heat stroke.*—Here the patient is not attacked whilst in the open, but after retiring to his hot bungalow. It is the most frequent form, in my experience. In this case, at the onset the skin becomes pale: there is nausea, colic, and incontinence of urine. Convulsions now follow, to be succeeded by cyanosis, dyspnœa, and insensibility. The breathing is stertorous, the pupils contracted, and the temperature of the body may reach 108° F. to 110° F., remaining high for some time after death.

Etiology.

Marching during the hot weather is responsible, as one would naturally expect, for attacks. Thus in Madagascar, in 1895, the 14th French Battalion suffered greatly, due to a "murderous" march in the sun: 40 per cent. of the affected were lost.

The meteorological condition.—Roth and Lex state that, in their experience, warm days in the cool season of the year are especially dangerous. Moist air, absence of wind, and hot winds, all favour the onset of attacks. As regards *individuality*, new arrivals in a hot climate suffer more than old residents. Bryden, in his "Vital Statistics," showed the liability of newly arrived troops in India to be quadrupled.

The *plethoric* and *intemperate*, thus suffering from *fatty heart* or who have had *syphilis*, are found to be especially predisposed.

Influence of alcohol.—Sir Charles Napier, in Scinde, at the outset declared that the sun should have in his case no ally in drink. Alcohol can destroy the comparative immunity possessed by coloured races; for Dr. Yandell has shown how the negro, when he removes to the cities and drinks to excess, becomes as liable as the white race in America.

Overcrowding.—This is a dangerous factor, both in the open and under cover. Marching in close order is to be avoided in a tropical country.

Nature of the soil.—A sandy soil is by far the hottest to encamp on. The heat of Sibi and the Lower Bolan is such that even the natives leave the place during the hot weather.

Direct Causes.—Four different theories are held: (1) *The caloric theory* attributes the attack to the action of intense heat alone. The heat is supposed to disturb the regular action of the heat-regulating centres of the body.

(2) The *autotoxic theory* states that a high temperature causes the blood to become poisonous to the nerve cells, especially those of the vasomotor centres and cardiac ganglia.

(3) *The chemical theory.*

(4) *The microbic theory* of Dr. Sambon.

Treatment.

(*A*) Preventive Measures.—In all cases where the soldier or traveller is exposed to a hot sun, alcoholic drinks should be eschewed, and tea or coffee be the chosen beverage.

As to *dress*—(*a*) *The head-covering.*—In the writer's opinion, the best protection against the sun is afforded either by the lungi with spectacles or the solah-topi. As an article of military dress, the ordinary cork or wicker helmets are more or less admirably adapted to form sun-traps. The Wolseley Egyptian helmet, the grey topi, the grey Elwood helmet, have all been well spoken of. Lastly, old European residents in Egypt, whenever they go into the desert on a shooting expedition, are accustomed to wear under their helmets a tight jean skullcap, similar to that worn by the Arabs under the turban or tarboosh, and find that it greatly diminishes the penetration of the sun's rays.

(*b*) Next to the head, it is most important to protect the eyes, by the use of neutral-tinted spectacles.

(*c*) And, finally, the spinal cord must not be forgotten. A thick woollen pad sewn into the coat should be worn.

(*d*) The dress must be loose round the neck, chest, and abdomen. The *material* should be a light woollen one, or khaki serge; cotton is not advisable, being a great conductor of heat; wool, on the other hand, is a slow conductor. As regards *colour*, some experiments formerly made at Aldershot showed the least absorbing colour for the direct heat of the sun to be white, then grey, yellow, pink, and black. After several attacks of severe sunstroke necessitating frequent invaliding, I read one day a letter from an executive engineer in the "Pioneer" on the prevention of sunstroke. This officer had had three attacks of sunstroke. He had then come to the conclusion that the

dangerous rays of the sun were not the heat rays, but the chemical. His argument was based on the fact that no one ever gets heat stroke from exposure to a dark source of heat, or one where the luminous rays possess no degree of chemical energy, *e.g.*, the furnaces in an arsenal. In scientific language, the actinic rays are the dangerous ones; they will pierce through anything except a layer of colour, interposed to act as a filter. He therefore argued that the only way to ward off sunstroke was to treat his body as a photographer treats his plates, and envelop it in red or yellow. He therefore lined his helmet and coat with yellow, and, after five years of extreme exposure, had no further sun attacks. Acting on this theory, I lined my helmet with orange-red flannel, had a similarly coloured pad sewn into the inside of my khaki coat at the back, and wore an orange-red shirt always when on the line of march. I never again felt the effects of the sun. I would therefore strongly recommend similar measures to be undertaken by any officer who cannot stand the direct heat of the sun.

(*B*) Curative Treatment.—On the occurrence of heat stroke, the patient should be moved into the shade where possible, his clothes opened, and cold water from a mussack be poured on to his head and neck. Ammonia should also be applied to his nostrils. The douche must be repeated until a favourable effect be produced. A turpentine enema should also be administered, and a large mustard poultice applied to the chest. Ice to the head should not be applied in cases where the skin is cold and the pulse feeble. If convulsions occur, a few whiffs of chloroform are indicated. In the form characterised by the long persistent subsequent head pain, blisters to the shaved vertex and nape of the neck, with quinine, give some relief, but time is here the chief remedy.

In Italy, in cases of direct heat stroke, the administration of a solution of trinitrine (1—1,000), twenty drops to water, 4,500 minims, every quarter of an hour, until the complete disappearance of the symptoms has been found successful.

As regards *venesection*.—This has been advocated by some practitioners. But, impressed by the eloquent words of the late Professor Maclean as to the invariable fatality induced by this proceeding, I can offer no opinion as to its usefulness, as I have never dared to abstract blood. *Lastly*, any one who has once suffered severely from heat stroke should not return to the tropics.—Extracted from a paper by Dr. Duncan, in the *Edinburgh Medical Journal*, March, 1903.

THE PASTEUR INSTITUTE AT KASAULI, INDIA.

The Pasteur Institute at Kasauli in the Simla Hills, evidently justifies its inception, not only when judged by the successful antirabic treatment of many patients, but also by the other scientific investigations which are being undertaken there. The Institute was opened on August 9th, 1900. During the first two years of its existence 321 and 543 persons respectively underwent antirabic treatment. The Institute is conveniently situated in a district which enjoys a temperate climate, being some 6,500 feet above sea level. The results of treatment have proved eminently satisfactory when the infected persons are brought under treatment at an early period. The period of incubation and hydrophobia lasts fourteen days and the "intensity" of the treatment varies with the date on which, after being bitten, the patient presents himself at the Institute. The course of treatment lasts from eighteen to twenty-one days, during which time daily inoculations are administered. The animals which inflicted the bites were dogs, jackals, horses and cats. Of 215 Europeans treated during the year ending August 9th, 1902, all recovered; and of 328 natives, five died. The deaths occurred in persons bitten by jackals, and lately it has been found advisable to treat patients bitten by these animals by the intensive method; since this plan has been adopted no death has occurred amongst those bitten by jackals.

At the Institute several investigations and methods of treatment by inoculation have been carried out. Of these may be mentioned the preparation of antivenene after Calmette's method, and the investigation of Surra disease in horses and mules. Besides these the usual laboratory work in connection with malaria, tubercle, plague, serum, diagnosis of typhoid and Malta fevers, &c., has been undertaken. The present staff consists of: Major D. Semple, R.A.M.C., Director; Captain Harrison, R.A.M.C.; Captain Smith I.M.S.; Assistant-Surgeon C. J. Fox; and Hospital Assistant, Nanak Chand.

Reviews.

Forest Mosquitoes and Forest Malaria. Review of a paper by Adolph Lutz, which appeared in *Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten*. Volume xxxiii. 1903. No. 4.

During the construction of a railway from Sao Paulo to Santos in Brazil, Dr. Adolph Lutz had an opportunity of studying the habits of several species of mosquitoes, and the means by which various plants, owing to their capabilities of retention of water, provided breeding places for their larvæ. The railway line ran through a steeply rising, well wooded, uninhabited area, in which numerous mountain streams were plentiful. It is therefore a district in which stagnant pools are unknown.

Whilst an adjoining railway was being built, some thirty years ago, it is recorded that intermittent fever prevailed amongst the labourers on the railway; but after the construction of the line was completed malarial fever disappeared even amongst families dwelling in close proximity to the railway.

When building the new line, thousands of labourers were employed who were lodged in the forest along the line in clearings made for the purpose, and called *ranchos*.

It was only a short time before many cases of intermittent fever occurred, these being particularly numerous in those stationed in the ranchos lying lowest and in a considerably warmer temperature; in the

hot season, however, the disease travelled upwards to the top of the mountain.

The engineers, who were not sleeping in the infected zone, all escaped the disease.

The fever was of a benign type and quinine being plentiful, the inconvenience was not very great. Relapses, however, were frequent, and induced an anæmic or cachectic state; cases of death, however, were exceedingly rare.

The author examined some of the labourers and demonstrated that the infection was of a benign type with fairly scanty, large plasmodiæ. Only in those spots lying low and where the forest abuts on a marsh, a few cases of æstivo-autumnal fever were observed; and correspondingly, a species of *anopheles*, the larvæ of which lived in the marsh water, were met with.

Fig. 1.—*A. Lutzii*, Theob., ♀.

Reproduced by kind permission of the publishers, from Col. Giles' Handbook of Gnats or Mosquitoes.

In those ranchos the walls of which consisted not of boards but of wicker work, furnishing numerous inlets for insects, mosquitoes were not found during the day time though they were very troublesome during the evenings and nights. Early in the mornings they flew into the open air. The dawn mosquitoes have a swarming time and the author was able to watch this in the case of *Anopheles argyrotarsis.*

In order to personally investigate the conditions, the author resolved to spend a few nights on the spot and for this purpose, chose a rancho situated half way along the old railway line inhabited by an engineer whose wife had acquired intermittent fever. During the very first evening following a very warm day numerous mosquitoes appeared around the lamp. Amongst these there were a few *Simulium pertinax* (Kollar), a few more or less injurious *culicidæ* and a mosquito unknown to Lutz, distinguished by spotted wings and the perpendicular position it assumed whilst feeding; notwithstanding its small size and delicacy it proved a greedy blood sucker, perching at once on the persons present, as well as on a small dog, without the preliminary trumpeting. On this account, and because it is small and its bite less painful than that of other kinds, this mosquito might be easily overlooked, especially as it appears in the twilight.

At the time the variety of mosquito was not known, but subsequently this mosquito was proved to be an anopheles and named by Theobold the *A. Lutzii.* This species the author found was very frequent in the mountain forests near the coast, and along the coast, following the course of waters from inland. The author has found specimens in a series of places from Santos to Conceicão, and also in the State of Santa Catharina. On the other hand it has hitherto never been found far inland.

Fig. 2.—*Nidularium ampullaceum, E. Morr*, small epiphytic specimens that store water plentifully. Total height 20 c.m.

Breeding Places.

The author now set himself to discover the breeding places of this anopheles. Now in this country it is well known that in all damp forests numerous gnats of known and unknown species, congregate, and also that in such places stagnant water and puddles are very seldom found. The author took these circumstances into consideration as affecting the conditions of life of the larvæ. He had no doubt that they existed in water, and that the breeding places must therefore be sought in available agglomerations of water.

He had long been aware that many plants possess the peculiarity of storing up water, which is again utilised by various insects, &c. On the Hawaiian

Islands he had even observed that a pandanaceæ, *Freycinetia Arnothi*, regularly stored up water, and that the plant was the only and permanent dwelling-place of a small crab (an orchestia) resembling the *Gammarus pulex* in form and size.

The epiphytic Bromeliacea store up water which is even used for drinking purposes; more frequently the botanist, particularly the gatherer of orchids, is made aware of its presence in the form of an unexpected and none too clean douche.

As all sorts of small creatures find a home in this plant, the author examined it with the fullest confidence as to the result of his search. His first experience was a disappointment, as the parasitic plant seemed to grow too high up on the forest trees —about 30 ft. from the ground—those that had fallen with the trees had spilt their water. Therefore, if the mosquitoes bred in the Bromeliacea, it must be high in the air.

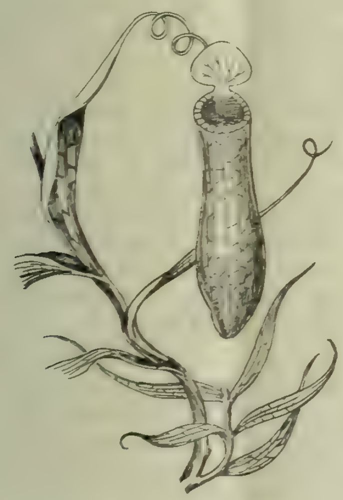

FIG. 3.—*Nepenthes gracilis.* Pitcher plant, in which water collects, and serves as breeding places for mosquito larvæ and other insects.

Later on, however, the author's patience was rewarded, many plants in more get-at-able positions were found in the same region, and in these were discovered, not only the larvæ of many gnats, but also those of the *A. Lutzii.* The author, after many years' observation, is confident that the typical forest mosquito, without exception, spends its larval condition in the water of the Bromeliacea.

The monocotyledonous family of the Bromeliacea, the best known species of which is the banana, is very large and very frequent in tropical America. It is also well-represented in the State of Sao Paulo, in Brazil; but most of the species there, however, live as epiphytics. The sword-shaped leaves, in a few species, are as small as blades of grass, in others are about 10 ins. wide, the length being considerably over a yard; sometimes, however, they are only from a ¼ to ½ yard in length. These leaves grow in spiral form closely crowded, and not tapering to the base. They therefore embrace the stem and the neighbouring leaves in a sheath-like form, and in addition to forming a funnel with their upright leaves, they possess numerous bag-like cavities which catch the rain-water as it runs down their furrows.

The water only disappears from the plants after prolonged droughts. Perhaps the plentiful dew prevents the water from drying up.

The genera most commonly met with are: *Vriesia, Nidularium, Billbergia, Æchmea, Bromelia,* &c.

Though larvæ may be found in the smaller varieties, the larger specimens are more likely to exhibit them, but their examination is somewhat difficult.

When simply clipped off, numerous leaf funnels simultaneously become emptied of water; and the water running down the leaves is spilt in every direction. A better plan is to root up the plant and pour the contents on to an India rubber sheet, but in this process even many larvæ and pupæ remain attached to the leaves, so the following method has been found by experience to be the best. By means of scissors or a sharp knife all the long leaves are cut off leaving a stump about ten inches in length. The plant is then carefully uprooted and the water is easily poured out. In large specimens the quantity may exceed half a litre; the entire stump may also be subsequently rinsed in a suitable vessel. The water thus collected contains the entire fauna for examination.

The water from the Bromeliacea contains numerous dead leaves, stems and branches as well as a fine "*humus*" formed therefrom, and in this one finds small crustaceans, tadpoles, and such diverse specimens as the larvæ of culicidæ, corethra and chironomus. One form of creation preys on another; the megarhinus larvæ commit great depredations amongst the smaller culcidæ, they are therefore for purposes of investigation isolated and fed on valueless larvæ.

The larvæ obtained can be further bred in the water from Bromeliacea. It is advisable to pour this water into flat vessels and add a few green algæ. Probably the living leaf of Bromeliacea emits bubbles of oxygen, keeping the water fresh. That is probably why the larvæ bred in Bromeliacea seldom come to the surface and lie at the bottom on their backs, as if they sought for air there, with the respiratory syphon directed downwards.

Notes and News.

THE deaths from tropical diseases reported in Manilla (population 302,154) for the month of November, 1902, were as follows: Intermittent fever and malarial cachexia, 11; Asiatic cholera, 256; dysentery, 10; plague, 1. In addition to these, 15 deaths from cholera occurred amongst "transients."

AMERICAN MEDICAL ASSOCIATION.—The next meeting of the Association will be held in New Orleans, on May 5th. Communications should be sent to Isadore Dyer, 124, Baronne Street, New Orleans.

FOOD AND DRINK IN THE TROPICS.—For officers in Southern Nigeria, the medical adviser to the Government enjoins, amongst others, the following rules:—

If a man has been a total abstainer before coming to West Africa let him remain so.

If a man has been a temperate drinker before coming to West Africa, let him be more strict than ever in his temperance.

If a man has been a free liver, it is *absolutely essential* that he should change his habits without delay.

As to spirits, brandy, gin, rum and absinthe should be regarded as poisonous. Old whisky in great moderation, well diluted, and never taken on an empty stomach, is perhaps the least deleterious of spirituous liquors and the slowest poison.

Coffee, tea and cocoa are excellent restoratives for the fatigued body or wearied brain, and are far better in the performance of hard work than alcohol.

MATÉ TEA.—We have received several circulars advocating the use of Paruguay tea under the name of Maté and Ierba Maté. Will some of our readers in South America, where Paruguay tea is said to be largely drunk, supply us with some information on the subject. Is the tea generally used in South America as a beverage? Does it supplant tea and coffee there? Does it cause any untoward symptoms when continuously and persistently used? That the leaves of the *Ilex paraguensis*, or Brazilian holly, supplied a decoction possessing some stimulating and sustaining properties has long been known; but that the leaf should be put on the market in serious competition with tea, coffee, or cocoa, is another matter.

LONGEVITY IN MANILLA.—The report of the Board of Health for the city of Manilla states that the number of persons who died between the ages of 80 and 90 years amounted to thirteen; between 90 and 100, seven; between 100 and 110, three; between 110 and 120 years, two. As an anti-climax the list ends with two deaths, ages unknown. The birth register of the city evidently requires revision; that the Filippinos kept careful records of births 120 years ago is, from this announcement, to say the least of it, doubtful.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists, the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis.

(1) BEITRAG ZUM STUDIUM DER ANCHYLOSTOMIASIS [Contribution to the Study of Ankylostomiasis], by V. Grünberger. *Wiener Med. Wochenschrift*, Nos. 51 and 52, 1902.

(2) ON ANKYLOSTOMIASIS, by Surg.-Lieut.-Col. Oswald Baker, I.M.S. (retired). *British Med. Journ.*, March 28th, 1903.—According to Baker, the correct term for the parasite causing ankylostomiasis is *Ankylostoma* (not Ankylostomum) *duodenale; ankylostomata* is to be used when referring to more than one worm. In Dr. Baker's opinion ankylostomiasis is one of the most prevalent and fatal maladies in the Tropics. The disease is believed to exist in about three-fifths of the globe between 50° N. and 30° S. latitude. The mode of infection is no doubt by the mouth; and fingers dirty with earth containing embryos which have reached the soil by the dejecta of human beings infected with ankylostomata are the probable channel. Moreover, Looss seems to have definitely proved that the embryos can enter the body directly through the skin. The signs and symptoms of the disease are epigastric discomfort, capricious appetite, and finally pronounced anæmia.

Post-mortem examination of the intestine shows the intestine from the second portion of the duodenum to the ileum to be inhabited by ankylostomata, and marked by flea-bite-like ecchymosis where the parasites have been sucking. The worms are sometimes half buried in the mucous membrane, and therefore difficult to find. The numbers present may range from 1 to 863 (Sandwith), or as many as 2,768 (Ernst). The generation of a toxin by the parasites in the intestine has not been proved, although the necrotic changes in the liver would seem to indicate its presence.

The prevention and treatment of ankylostomiasis is summed up in one word, "sanitation." As oxygen is necessary for the development of the embryo from the ova passed in the stools, all that is necessary to ensure prophylaxis is careful burial of excreta. On the other hand, prolonged and thorough exposure of the ova to solar heat brings about their complete destruction. Thymol in doses from 10 to 60 grains, given three times in one day, at intervals of half an hour or some hours, is usually sufficient to eradicate the disease. Should, after four or five days, parasites reappear the treatment is repeated. Thymol should be given to weakly people in 10-grain doses; it may be administered in water, or in wafer papers.

Beri-Beri.

THE State surgeon of Negri Sembilan writes in the *Singapore Free Press* that beri-beri causes more than two-fifths of all deaths among Chinese coolies in Negri Sembilan; the actual mortality from beri-beri being 97 in every 10,000. He is inclined to ascribe beri-beri to imported rice, stating that so long as the native garnered and prepared his own rice beri-beri was unknown, but with the extended use of imported, that is, "stored" rice, the disease spread actively.

Blackwater Fever.

A CASE OF BLACKWATER FEVER TREATED WITH LIQUID EXTRACT OF CASSIA BEAREANA, by H. Cooke. *Lancet*, March 21st, 1903.—Dr. Cooke, Medical Officer to the Zanzibar Government in Pemba, treated a case of blackwater fever in January, 1903, after administering a dose of 3 grains of calomel, with 15-minim doses of liquid extract of cassia beareana. The dose was well diluted with water and exhibited every half hour at first, afterwards every hour, and then every two hours. After the first dose vomiting ceased, the temperature fell, and the patient dozed occasionally. In forty-eight hours after the first dose the patient was practically convalescent. A description of the cassia beareana is given in the *Lancet*, February 1st, 1902.

Diarrhœa.

(1) THE ETIOLOGY OF SUMMER DIARRHŒA IN INFANTS, by C. W. Duval and V. H. Bassett. *Centralblatt f. Bakt. und Parasitenk.*, xxxiii., p. 52.—The bacillus of Shiga was met with in the stools of forty-two cases of summer diarrhœa, in scrapings from the mucous

membrane of the intestine, and in one case from the mesenteric glands and liver. The cases studied included examples of so-called dyspeptic diarrhœa, of enterocolitis, of malnutrition, and of marasmus with superimposed infection. The bacillus was not found in the stools of healthy children, nor in those suffering from simple diarrhœa.

(2) CUTTLE-FISH BONE IN INTESTINAL CATARRH, by Geo. Herschell. *Internat. Med. Magaz.*, xi. No., 10.—Herschell comments on the use of powdered cuttle-fish bone in the treatment of intestinal flux acquired in tropical climates. He gives ½ to 1 dram three times daily, after a preliminary dose (½ oz.) of castor oil, repeated every two or three days during treatment. Herschell records successful cases of dysentery, sprue, chronic diarrhœa and bilious diarrhœa treated in this fashion.

Dysentery.

(1) TREATMENT, by P. Masaïev. *Sem. Méd.*, xxii., No. 53.—In early stages of dysentery, after a dose of castor oil, Masaev recommends salol. bismuth subnitrat., sodium bicarb., āā 4½ grains, and opium ¼ grain. If the disease has lasted some days the oil is omitted.

(2) OBSERVATIONS ON THE TREATMENT OF CATARRHAL DYSENTERY IN THE TROPICS, by P. C. J. Van Brero, Java. *Archiv. für Schiffs-und Tropen Hygiene.*—In the treatment of catarrhal dissentery, Van Brero recommends warmth, confinement to bed, a diet of rice, sago, *maizena* or *nassi-tim*, a decoction made by boiling rice with minced chicken, veal or sweetbread. The drug preferred is salicylate of bismuth, in 20-grain doses, repeated every four hours, with opium occasionally at the commencement of the illness. Intestinal irrigation by warm weak permanganate of potash lotion repeated four or five times daily, and within half an hour after the bowel has thus been washed out, a clyster of iodoform, 1 gramme; bismuthi subnitrat., 250 milligr.; pulv. acaciæ, 250 milligr.; aquam qs. ad. vol., 50 cc., should be thrown up the bowel. The enemata are to be continued as long as any slime appears with the motions. Van Brero speaks highly of an infusion of djambu-bidji leaves—the *psidium ganjava L.* The infusion is made by adding 200 cm. of water to 50 grammes fresh or 25 grammes dried leaves, and infusing for one hour. A full description of Van Brero's treatment will be found in the *Indian Med. Record*, No. 226, 1902.

Dysentery and Typhoid.

AUS DEM INSTITUT FUR INFEKTIONS KRANKHEITEN IN BERLIN. UEBER LÖSLICHE DURCH ASEPTISCHE AUTOLYSE ERHALTENE GIFTSTOFFE VON RUHR-UND TYPHUS-BAZILLEN [From the Institute for Infectious Diseases in Berlin. On Soluble Toxins of the Bacilli of Dysentery and Typhoid Maintained by Aseptic Autolysis], by H. Conradi. *Deutsche Med. Wochenschrift*, January 8th, 1903.

Dysentery.

DIE BLUTSERUM THERAPIE BEI DER DYSENTERIE [Blood-Serum Therapy in Dysentery], by Prof Kruse. *Deutsche Med. Wochenschrift*, January 1st and 5th, 1903.—Kruse described the bacillus of endemic dysentery in the *Centralb. für Allegemeine Gesundheitspflege*, 1900, Nos. 5 and 6, and in the *Deutsche Med. Wochenschrift*, 1900, No. 40; 1901, Nos. 23 and 24; also in the *Deutsche Aerzte-Zeitung*, 1902, No 2. He maintains that although sanitation and good drainage are theoretically the proper means whereby to combat endemic dysentery, such means are not always possible to obtain, and he therefore set to work to prepare a bactericide serum whereby to treat endemic dysentery. He injected into guinea-pigs the bacillus of dysentery: these animals when not injected with the curative serum died in from seven to ten days, but when treated with the serum recovered within three days. He treated several cases of endemic dysentery in hospital with the curative dysentery serum, with the result that of nineteen cases only one died. Kruse says that although the number of cases reported upon is too few to come to a really definite conclusion upon, yet after the injection the course of the disease aborted more or less rapidly. He contends that by serum-therapy in endemic dysentery, the severity of the attack is modified, the duration of the illness and convalescence shortened, and the mortality lessened. Although convinced of the prophylatic value of his serum, his observations are too limited as yet to warrant him arriving at a conclusion.

Leprosy.

The total number of lepers reported in the Philippine Islands on November 30th, 1902, is returned as 3,288.

EIN FALL VON LEPRA TUBEROSA IN TRIEST [A Case of Lepra Tuberosa in Trieste], by E. Freund. (*Wiener mediz. Wochenschrift*, No. 1, 1903).—This case deserves mention as demonstrating the infectivity of leprosy. The patient acquired the disease through his brother who had for a long time lived in intimate connection with two lepers, but without himself becoming infected.

SEGREGATION OF LEPERS IN THE UNITED STATES.—The Committee on National Leper Homes, at the meeting of the American Public Health Association held in New Orleans, December, 1902, recommended that one, or preferably two, national leprosaria should be founded. The formation of asylums for lepers in the United States is a definite answer to those who would abolish them on the plea that leprosy is not contagious, and that the leper can mix freely with healthy persons without any danger to the community.

Yellow Fever.

Dr. Eduardo Ligeuga, of Mexico, in his report on Annual Fever in Mexico, read before the American Public Health Association, in New Orleans, December, 1902, stated that yellow fever had spread along the Mexican coast during 1902. During the recent yellow fever epidemic in Vera Crux, 873 of the cases had occurred on the coast of the Gulf of Mexico, and 27 on the Pacific Ocean coast.

Liver.

SODIUM GLYCOCHOLATE IN HEPATIC DISORDERS, by H. Richardson. *Medical Record*, lxiii., No. 5.—In the hepatic ailments of alcoholics, persons of sedentary habits, in chronic malaria with enlarged liver and icteric hue, 5 to 10 grains of sodium glycocholate in capsule thrice daily is recommended by Richardson.

Malaria.

RAYNAUD'S ANTIMALARIAL MIXTURE :—

Tinct. iodine	90 minims.
Potass. iodide	90 grs.
Dist. water	5 oz.

Dose, one teaspoonful in water at commencement of paroxysm, repeated in fifteen or twenty minutes if no improvement.

VERSUCHE ÜBER DIE UEBERTRAGBARKEIT DER MALARIA DURCH ANOPHELESSTICHE [Experiments on the Transmissibility of Malaria through Bites of the Anopheles], by W. Favre. *Russkij Wratsch*, Nos. 42 and 43, 1902.

EUCHININA NELLA CURA DELLA MALARIA [Euquinine as a Cure for Malaria]. *Gazetta degli ospedali e delle cliniche*, No. 141, 1902.—The author states that this drug is very reliable. Even if given in large doses it causes no gastric disturbances, and if these are present it does not aggravate them. Euquinine is particularly useful in conducing to the reduction of the spleen.

DIE NEUESTEN FORSCHUNGEN ÜBER MALARIA. ZUSAMMENFASSENDE UEBERSICHT [The most recent Researches on Malaria. Comprehensive Review], by J. Mandl. *Der Militärarzt*, Nos. 23 and 24, 1902.

AT a meteing of the Society of the Charité doctors in Berlin, held on December 11th, 1902, Dr. Kuhn demonstrated microscopical preparations of the plasmodia of malaria, after the Romanowsky method of staining.

THE BASIL AND THE NEEM, by Captain S. P. James, Lahore, India. *Brit. Med. Journ.*, March 21st, 1903.—According to Mr. Shipley, in an article published in *Nature*, there is a widespread belief amongst natives of Africa that the presence of a certain plant (*Ocimum viride*, Willd) in a room drives away mosquitoes.

Captain James states that, although several species of the same plant occur in India, the plant has gained no such reputation there. He, however, finds that natives in India ascribe the property of driving away mosquitoes to the "neem" or margosa tree. This plant belongs to the *Meliaceæ*, and comprises five species. To the neem-tree many medicinal virtues are assigned; its bark is utilised in malaria, and in houses or villages surrounded by these trees fever is said to be held in abeyance. Whether the tree actually wards off mosquitoes, Captain James remarks, may be uncertain, but he states that the leaves, when burnt and dried, prove efficient in killing mosquitoes when burnt in a room for half an hour.

TROPEN-KRANKHEITEN UND KOLONIALE MEDIZIN: MALARIAIMMUNITÄT UND KINDERSTERBLICHKEIT BEI DEN EINGEBORENEN IN DEUTSCH OSTAFRICA [Tropical Diseases and Colonial Medicine; Immunity from Malaria and Infant Mortality in the Natives of German East Africa], by Staff-Surg. Steuber. *Deutsche Med. Wochenschrift*, January 22nd, 1903.—Steuber finds that the immunity of the adult natives of German East Africa is due simply to the survival of the fittest. The infant mortality from malaria amongst the natives is extensive; but those who survive childhood possess a relative immunity during adult years.

Plague.

DIE PEST IN ODESSA [The Plague in Odessa], by L. Rabinowitsch and W. Kempner. *Deutsche Med. Wochenschrift*, January 1st and 15th, 1903.

UEBER PRÄVENTIVIMPFUNGEN DER PEST [On Preventive Inoculations of Plague], by A. Besredka, *Russkij. Wratsch.*, Nos. 42 and 43, 1902.—The author claims that with his vaccine, tested in the Pasteur Institute, the period of incubation is only two days, and the immunity afforded a long one. The injection of Chawkin's vaccine is followed also by a long immunity, but the period of incubation lasts from eight to twelve days. The rapid immunity setting in after injections of plague serum is only of short duration.

Sleeping Sickness.

NOTES ON SLEEPING SICKNESS, by C. A. Wiggins, *Lancet*, December 13th, 1902.

Trypanosomiasis.

(1) TRYPANOSOMIASIS ON THE CONGO, by Patrick Manson, C.M.G., F.R.S. (JOURNAL OF TROPICAL MEDICINE, March 16th, 1903.

(2) TRYPANOSOMIASIS AND ITS CAUSE, by Alexander Maxwell-Adams, Junr. *Brit. Med. Journ.*, March 28th, 1903.—The writer thinks that the priority of laying the discovery of the trypanosoma in man before the scientific public rests with Dr. Dutton, but proposes to call the parasite "Trypanosoma Fordü." Dr. Maxwell-Adams remarks on the signs and symptoms, observed in the original case met with by Forde and Dutton, as follows: (1) Tbe œdema of eyelids affected the parts below the lower eyelids and varied from day to day; (2) the pneumonia was atypical and consisted of a limited consolidation of the base of the left lung; (3) the scanty expectoration was inclined for a few days to be rather of an arterial than a rusty colour. As to the etiology of the disease, Dr. Maxwell-Adams suggests infection by rats. The patient observed by Forde and Dutton had been twice bitten by rats. Trypanosomiasis is a common disease in rats, and if the parasite has several metamorphoses the origin is probably in some insect infecting the rat. If this surmise is correct, the rat is necesssry to the continuance of the life-history of the trypanosoma, its occurrence in man being accidental.

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The Journal of Tropical Medicine.

CONTENTS.—APRIL 15TH, 1903.

Original Communications.

TROPICAL HYGIENE.

LECTURE I.

The Conditions which Necessitate the Practice of a Special Application of Hygiene in the Tropics.

By W. J. SIMPSON, M.D., F.R.C.P.

(*Continued from page* 104.)

Physiological or Pathological Effects of Tropical Regions on the European.—There can be no doubt that the new environment produces a certain change in the individual inducing a susceptibility to diseases or disorders peculiar to the Tropics. The climate, the general character of the plants, the inhabitants, their food, clothing, habit, customs, mode of thought, and their diseases, differ widely from those which are usually to be found in a temperate zone. They are factors which are bound to gradually affect the new-comer, and they necessitate a certain adjustment to the new conditions on the part of the individual. This adjustment, in some respects, may be voluntary, but in others it is involuntary and beyond control.

For instance, as regards involuntary adjustment, the effect of a tropical climate, whether dry or moist, on a European constitution, is to gradually bring about a change in the customary physiological functions of certain organs of the body. The change is an effort on the part of the system to adapt itself to the new conditions. Until this process of acclimatisation is fully attained and the system has accommodated itself to its surroundings, the individual is, from the slightest indiscretion, highly susceptible to disorder and disease. The most important of these changes are a greater supply of blood to the surface of the body and a greater activity of the functions of the skin, which, by profuse perspiration, keeps the body at its ordinary temperature. The adjustment of the system to counterbalance the additional external heat is not completed for some time in the newly-arrived European, and until that time is reached the temperature of the European is slightly higher than when in Europe. It is stated that the temperature of the body rises 0·05° F., for every 1° F. increase in the temperature of the air. Numerous experiments have been made by several observers which corroborate this statement. Dr. Crombie has shown that the body temperature of Europeans living in Bengal is about 0·41° higher than the average of healthy persons in England. This is shown by the following table:—

TEMPERATURE IN EUROPEANS IN TEMPERATE AND WARM CLIMATES.

	Mean a.m.	Mean p.m.	Mean.	Mean daily.
English average ..	97·963 ..	98·341 ..	98·084 ..	1·41
Crombie's Indian average for Europeans (1,268 observations)	98·21 ..	98·77 ..	98·49 ..	1·31

Experiment has shown that high temperature can be well borne as long as the air is dry, for instance a temperature of 260° F. could be borne without discomfort, and with a rise of only 2·5° F. of bodily heat, when the air was dry and the skin and lungs freely acting, but in a moist atmosphere the temperature of the body rapidly rose. Excessive humidity interferes with free evaporation from lungs and skin.

It is important to remember that exercise in the Tropics raises the temperature, and that if the temperature is recorded in the afternoon, when exercise is usually taken by the European, the temperature will be found to be higher than at other times of the day. A long march in the sun, especially if dressed in unsuitable and tight clothing, is apt to produce a considerable rise in temperature, which otherwise might be considered to be due to malaria. These fevers due to fatigue and exposure to the sun are ephemeral in their nature, and the patient is usually well in a few days. They are not to be mistaken for the fevers dependent on more specific causes.

Other important changes take place in the bodily functions when an individual is transferred to a tropical climate. Owing to the new distribution of blood and its diversion to the surface of the body, the capacity of the lungs increases. It has been estimated that as much as twenty-three ounces of blood have been withdrawn from the lungs under the influence of a temperature of 80° to 83° F. The space occupied by the blood is replaced by air, hence the lungs weigh less in hot than in cold climates. Notwithstanding this change, which gives increased capacity to the lungs, they perform less work in warm climates, because at the same time the number of respirations are reduced. This reduction in the number of respirations, combined with the fact that the air, rarified by heat, contains less oxygen than the same quantity of cold air, effects an important change in the physiological working of the lungs. Less oxygen is inspired, and about 20 per cent. less CO_2 and watery vapour is given off by the lungs. It is estimated that 9 per cent. less oxygen is inspired at 80° F. than at 32° F. Changes of this kind tend to produce a retention of carbonaceous matter in the blood. With these changes there is a greater functional activity of the skin, liver, bowels and spleen. Generally, however, the effect of a warm climate is to diminish the vital activities; thus the pulse is slowed and the heart's action weakened, the powers of digestion are enfeebled, the appetite lessened, nutrition depressed, manifesting itself in loss of weight or a superfluous deposition of fat and lessened bodily vigour. The nervous system, which is first of all stimulated and later depressed, is put in a state of tension which allows of it to be easily affected by external impressions. All these changes may consort with a feeling of health, and it is only after a prolonged stay in the Tropics, or when the individual has some weak point in his constitution, or most frequently of all, when the laws of health are not attended to that the relaxed state of the system is followed by derangement and disease.

The Illnesses of the Tropics, with the exception of those caused by parasites, microbes, and insanitary conditions, are essentially of a nervous or congestive character, which may fairly be attributed to climatic causes. Heat and exposure to sun, wind, and rain, in the Tropics are apt in a special manner to disturb the functions of the body, causing illnesses which are characterised by high or low fever, lasting for a few days or for several weeks, or by well-marked derangement of some internal organ. In the *nervous class* the nervous system may lose its tone and its firm governing power over the heat-regulating centres of the body; or it may sustain a shock from which it is unable to recover. In the *congestive class* the action of chills on a sensitive perspiring skin suddenly drives the blood from the surface of the body into the interior and there induces congestive disorders affecting the liver and bowels. The same may be the result of injudicious food and drink, clothing, exercise, bathing, or other circumstances, all or every one of which may increase the slight congestion of the abdominal organs which, owing to the relaxed condition, becomes the normal state in the Tropics.

The Practice in the Tropics of Personal Hygiene is based on the foregoing Considerations. Undue exposure to a tropical sun without sufficient protection is to be avoided. The heat rays of the sun are seldom felt so much by a new arrival as by older residents, and accordingly there is a tendency to pay but small respect to the sun which experience teaches to be necessary. The effects, therefore, are apt to be injurious, and the new-comer incurs a considerable risk of suffering from nervous depression, sun fever, or perhaps, worse still, from sun-stroke. New arrivals are always more liable to suffer than older residents. Always respect the sun, and if duty involves excessive exposure in the summer time, it is necessary for the head and spine to be thoroughly protected. In India this is effected by the solah topee, which is made of pith. It should be light, shaped to shield the temples and nape of neck, and so ventilated that the hot air covering the head shall readily escape and be replaced by fresh air. In places where the glare is great the eyes need protection by wearing neutral tinted spectacles. As the spine is sensitive to the sun's rays, a spinal pad fixed in the lining of the coat is an additional protection, especially when out riding. It is held by some that it is the active rays of the sun which are injurious rather than the heat rays, and under this supposition the topee and the pad are lined with orange-coloured material, and for the same reason a shirt of that colour may also be worn. Though care should be taken to ensure sufficient protection against the direct rays of the sun during the five or six hottest hours in summer time, and in some localities even for longer, nevertheless, as much time as possible outside of these hours should be spent in the open air. Experience has shown that ill-health arises when soldiers are confined during the day in the Tropics to close barracks, and hence every outdoor amusement is encouraged, except during a few of the hottest hours of the day. Confinement to close and darkened rooms in a great measure accounts for the exceptional ill-health which European women as a rule suffer from in the Tropics.

Exercise regular, and short of fatigue, is absolutely essential if health is to be retained in a warm climate. The people who enjoy the best health are those who are fond of riding and of outdoor exercise, such as lawn tennis, rackets, golf, and other similar pastimes. There is a great temptation to lead a sedentary life, but it must be resisted.

Exercise has an excellent antidotal effect on languor, stimulating the body as it does to get rid of its effete matter. It improves the digestion and thereby promotes assimilation, it gives vigour to the circulation through a torpid liver, it increases peristaltic action of the bowels and removes constipation, and it increases the respiratory movements, and the amount of CO_2 expired by the lungs, relieving the tissues of waste products and purifying the lungs. Harm may accrue, however, if the exercise is overdone, exhaustion ensues, the by-products of tissue change remain in the blood, and fatigue fever is the result. Great care must also be taken that after exercise, when the surface of the body is hot and the skin profusely perspiring, that no chill is caught by sitting in a draught, or under a punkah, or by exposure to a cool wind. If it is impossible at once to get a rub down

and make a complete change of clothing, the next best plan is to put on a sweater or great coat to prevent any risk of chill. Ladies are more liable to the effects of chill than men after exercise, because of their dislike of putting on immediately warm wraps.

A warm bath prevents chill and is refreshing. Few people can in a hot climate continue the cold bath to which they have been accustomed in England. It is apt to produce, especially when the body is overheated or fatigued, congestion of the internal organs.

For those who suffer in any way from bowel complaint or from disturbance of the liver, the cold bath is unsafe at all seasons of the year, and the warm bath is absolutely essential.

For healthy Europeans the tepid bath is, as a rule, the most refreshing, though some Europeans are able to go on with their cold bath. The bath can be taken at any time except while the process of digestion in the stomach is going on.

Dress is an important matter in warm climates, both for comfort and for health. It requires to be loose in order that there shall be free circulation of air between it and the surface of the skin to carry off the hot vapours that accumulate. It requires also to be made of absorbent material to prevent rapid evaporation and the production of chill. Wool possesses these properties, it is absorbent and permeable to the air, thus it will absorb the moisture from an active skin, allow a freer circulation of air through its fabric than any other material, and will prevent rapid conduction of heat from the body. It is pleasanter and healthier than either cotton or linen, because it preserves an equable temperature around the body, thus preventing chill, and it is cooler because it permits of a healthy interchange between the gases on the surface of the body and the atmospheric air. Silk has similar properties to wool. Cotton and linen, on the other hand, are not absorbent, and they are only half as permeable to air; consequently they are apt to cause oppression and discomfort, and are frequently the cause of chill, and occasionally heat-stroke.

Chill holds a very important position as the exciting cause of disease in warm climates. The sensitive and perspiring skin, the large amount of blood circulating near the surface of the body, and the lax condition of the vaso-motor system, are easily affected by external impressions. Anything conducive to chill, whether it be caused by rain, exposure to a cold wind, or other circumstance, is apt to act on the vaso-motor system, check perspiration, and drive the blood into the internal organs, setting up disturbances of the liver, lungs or bowels, and in the subjects of malaria setting up a recurrence of the disease. Hence the importance of garments next the skin which will keep the body at a uniform temperature, thereby preventing chill. It is easier to take cold in a hot climate than in a temperate one, because in the first, care is taken to cover the body with suitable clothing. Coarse flannel will irritate the skin. Nothing but the finest material should be used. For those who cannot wear wool, silk is a good substitute, or a mixture of wool and cotton. As long as the fundamental principle is practised of keeping loose woollen garments next the skin, the kind of upper garments is of small moment. They should be loose and light in weight. The colour should be white or grey, as these absorb the sun's rays least, while black and blue absorb them the most.

As regards *drink*, it is safest for the new-comer to abstain from alcoholic beverages, and especially so if much exposure to the sun is to be endured. Tea or coffee are the customary drinks of many of the inhabitants of the Tropics, and where these are not in use, water is generally the only beverage. It is well to follow the custom of the country in this respect. When alcoholic drinks are used, and they are often found necessary to the European after he has been some years in the Tropics, they should only be taken at meals, and preferably with the dinner in the evening.

PENETRATING WOUND OF THE ABDOMEN BY A SWORD-FISH.

By Dr. W. Renner.

Medical Officer, Colonial Hospital, Freetown, Sierra Leone.

This case is interesting from its rarity. No reason could be assigned for the sudden and fatal attack, as the men were returning home and were not fishing.

A similar attack had never been known by the oldest fishermen in the Colony, and owing to the inexplicability of the occurrence they have attributed it to the mysterious instrumentality of witchcraft. The attack took place in broad daylight.

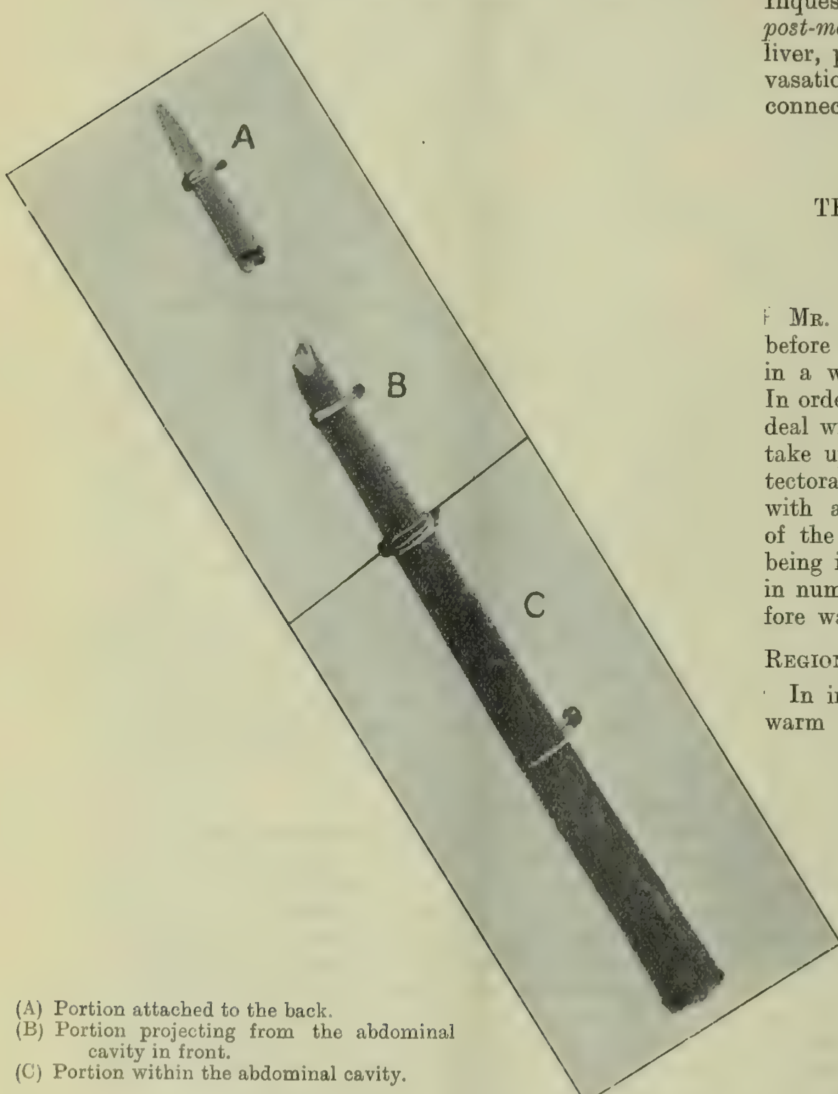
This case might be regarded as a West African yarn, but is, nevertheless, true, as the report shows.

John Pearce, aged 43, living in the village of Murray Town, was admitted into the hospital at 2.30 p.m. on December 19th, 1902. He was quite conscious, and stated that whilst returning home with his comrades in a boat from fishing, he was stabbed in the back by a sword-fish; the blade of the sword projecting in front of his abdomen. His friends made the following statement:—

They were four in the boat and were out at sea, returning home from fishing. A gentle breeze was blowing and the sail was up. Pearce was sitting on the gunwale of the boat like the others; they heard a sudden rush from the water, Pearce fell inside the boat and cried out that he was killed; they went to his aid and found that he had been stabbed by a sword-fish in the back, a portion of the blade of the sword was projecting in front of the abdominal wall. He bled profusely. When seen in the ward of the Colonial Hospital the bleeding had ceased.

Examination showed that the blade of the sword had passed from the back, about the second lumbar vertebra, to about an inch below the ensiform cartilage in the epigastric region and by the side of the cartilage of the eighth left rib, where the blade projected anteriorly about 3 ins. On the back of the patient two wounds were seen; one about 2 ins. below the twelfth rib and $1\frac{1}{2}$ ins. from the spinal groove, and to which was loosely attached the extreme portion of the sword-blade, measuring $2\frac{1}{2}$ ins.; about $2\frac{1}{2}$ ins. below this another wound, which was deeper and passed towards the body of the second lumbar verte-

bra obliquely in an upward and forward direction. In this lay the longer blade of the sword, which was 7½ ins. long, exclusive of the portion already noticed which was 3 ins. long. This was very firmly fixed. After consulting the Hon. Dr. Prout, we decided to perform abdominal section for the removal of the sword-blade from its firm attachment. Patient was placed under chloroform, and the peritoneal cavity was opened by an incision of 6 ins. long. A large quantity of blood welled out at once. Closer exami-



(A) Portion attached to the back.
(B) Portion projecting from the abdominal cavity in front.
(C) Portion within the abdominal cavity.

nation revealed that the sword-blade had transfixed the body of the man by the side of the vertebral column, fracturing a portion of the left transverse process, wounding the duodenum in its third part and the body of the pancreas, but not the stomach, piercing the left lobe of the liver and appearing between the cartilages of the eighth and ninth ribs in front. The sword-blade was firmly held in position, and on being removed the portion occupying the abdominal cavity, from the vertebral column to the ribs in front, measured 7½ ins. On removal of the blade a large quantity of blood issued from the liver wound, which was controlled by firm pressure, and search was made for wounds of other organs. The patient was in a state of extreme collapse.

The abdominal cavity was cleansed of all clots and the wound brought together and dressed in the usual manner. Patient was placed on bed. At 6 a.m., on the 20th, patient woke up and called for a drink of tea. His temperature was 98°, pulse weak. The patient had several attacks of hiccough during the day. He died at 8.15 p.m., the evening of the 20th. Inquest was held on the body of the deceased. The *post-mortem* examination revealed the wound of the liver, pancreas and duodenum, also extensive extravasation into the cellular tissue of the abdomen in connection with the mesentery and left kidney.

TROPICAL LIFE AS IT AFFECTS LIFE ASSURANCE.[1]

By James Cantlie, M.A., M.B., F.R.C.S.

Mr. President and Gentlemen,—The question before us seems to resolve itself into—" Does residence in a warm climate shorten the life of Europeans ? " In order to narrow the question, however, I will merely deal with British-born folk leaving the British Isles to take up residence in one of our British colonies, protectorates, or settlements. We have, therefore, to deal with a people dwelling between 50° and 60° north of the Equator, in a climate rendered temperate by being insular, who, by virtue of circumstances, proceed in numbers to countries nearer the Equator, and therefore warmer.

Regions for which an Extra Premium is Charged.

In insurance prospectuses I see that a dangerously warm country is regarded as one situated within 33° north of the Equator and about 30° south. To one who has travelled much in the Tropics, the application of this enunciation to individual regions must appear in many ways absurd in its limitations. In Central Africa, even—that much maligned region of the earth as regards its climatology and healthfulness—there are large areas which enjoy a salubrity of climate unsurpassed in any part of the world, tropical or temperate. In the West Indies, so usually stamped as sickly, there are islands, such as Barbadoes, in which malaria is unknown, and in the island of Jamaica climate of every variety, from tropical to cold, is to be found. In many of the Pacific Islands, likewise, an equable, enjoyable, and healthy climate is recorded; and in India, the Nillgherries, and many other parts, are accredited with the same attributes. Thus, there are many health oases in the Tropics which refute the attribute of being unhealthy, even although they lie within the area pronounced by the insurance company to be " dangerous."

[1] A paper read before the Life Assurance Medical Officers' Association, on February 4th, 1903. Printed by permission of the President of the Association.

No Statistics Available.

I may say at once, that if you expect me to give you statistics, suitable as a basis on which to found scientifically accurate estimates as to the value of life in the Tropics, whether of Europeans or natives, I cannot do so. There is no information available for such conclusions. To our Crown colonies and protectorates young men go out from this country in the prime of life, and, for the most part, after being carefully inspected medically. When they get ill they may be "invalided home" or seek change of climate locally. Again, the most serious illness in tropical countries, namely, malaria, incapacitates more often than it kills, and the meaning of the death-rate returns of Europeans in the Tropics cannot be gauged by the actuary who compounds his tables on information based on vital statistics collected in Britain. Even the carefully-compiled returns in Indian Army reports do not help us much, if at all, in arriving at a conclusion of any value. I will refer to this subject later, but I warn you that it is beyond my power to help the actuary by figures.

Who Drew up the Present Extra Premium Rates?

Who drew up the present rules that most insurance offices affect has often puzzled me; they were, most certainly, not the work of experienced medical men; and if by actuaries, then they may truly be said to have been drawn up "on general principles"; for there never existed, nor does there now exist, any reliable, or even approximately reliable, figures on which to ground an opinion. If by neither of these, therefore, on what are the extra premium charges founded? I have no hesitation in saying they are based, for the most part, on the most unreliable of all information, namely, gossip; or on the tittle-tattle of the old-time ship captain, who mostly gained his information from frequenters of river-side wharves or polluted harbours. It may be, however, impossible to individualise too closely, and perhaps the insurance offices are justified in the main. Most offices, however, declare "that they deal with each case individually," yet the "dangerous" area exists in their prospectuses. If each case is to be dealt with individually, it would be but logical that the 33° N. and 30° S. limits ought to be withdrawn. The two statements are at variance.

Is Heat the Factor of Danger?

I would point out, however, if it is *heat* that is considered so dangerous to life, it must not be assumed that the nearer the Equator the more oppressive the heat, for the hottest parts of the earth are not equatorial, not even tropical, but sub-tropical merely. Mooltaun, for instance, one of the hottest parts of the earth, is 30½° from the Equator, *i.e.*, 8°, or some 580 miles, north of the Tropic of Cancer. In dealing with the subject, it is necessary to remember that *warm countries* may be divided into *three zones: the equatorial, the tropical, and the sub-tropical.* (1) The *equatorial region* includes a belt round the earth 12° (or about 800 miles) north and south of the Equator. It is characterised by an almost complete absence of climatic *contrasts*; air, soil and water have a uniform temperature bordering on 80° F.; the day and night temperatures vary but a few degrees; and there is no appreciable difference of season. Everything reeks with moisture, and few storms stir the atmosphere. In so far, therefore, as climate is concerned, this is the most *uniform* of regions. (2) The *tropical* region, that is, the region of the earth between say, 12° and 22° north and south, is marked by distinctly tropical summers, with the wet season during the hot weather, and by marked seasons—the winters being cool. It is the region of strong winds and of typhoons or cyclones. (3) Beyond the tropical limits are *sub-tropical* regions with, in many parts, fierce heat in summer and severe cold in winter, and in many cases marked contrasts between night and day temperatures.

Difference of Climates and Diseases North and South of the Equator.

It may be well to divide the world, in regard to its *pathology*, into the regions to the north and south of the Equator. That the climatology of countries to the north and south of the Equator differs is well known, and it may be that for this reason the diseases differ also. There are two factors at once apparent which enter into this argument: *First*, that in the Eastern Hemisphere, at any rate, the great bulk of *land* is to the north of the Equator, and that, therefore, the climate in more of a *continental* type; and, again, the countries to the north of the Equator have been inhabited for a longer time, and by denser masses of human beings, more especially in Asia. It may be that the *soil* of the older countries has become contaminated by the excreta or bodies of dead animals and human beings, through a long series of years, from which the sparsely-populated continents of Australia, and South America, and of the promontory of Africa, south of the line, have been free. Be this as it may, there is no doubt that not only the climatology, but also the diseases, to the north and south of the line, differ considerably, be the explanation what it may. I therefore propose to deal chiefly with the area of the Eastern Hemisphere north of the line, for it is there the human race is chiefly collected, and the countries to the south of the Equator have a more recent and very much less dense population — one that *overflows* merely from the great continents to the north. Throughout my paper, therefore, unless otherwise mentioned, I deal chiefly with the countries of the Eastern Hemisphere to the north of the Equator.

The Effect of a Warm Climate upon British-born Folk.

When one born and brought up to adult years in Britain takes up residence in a warm climate, the heat acts as a stimulant. The *physiological* processes are increased in activity, appetite is good, digestion is excellent, and work and recreation are performed with unwonted vigour. The heat is enjoyed, and even where heat and moisture prevail, constituting the "trying" time of the year, the new arrival makes light of it. The *liver* is called upon for extra work, as proved by the copious loose bilious stools which are passed, resulting in a buoyancy of spirits and a feeling of fitness.

In some six to eight months, however, the *initial* stimulus wanes. The pitch of physiological excess which the digestive and cutaneous organs have been performing cannot be maintained, and the *opposite* obtains. The vigorous appetite flags, and may want stimulating by either alcohol, hot curries, or other means; digestion becomes impaired, involving drowsiness and abdominal fulness and flatulence soon after meals; the loose motions are succeeded by constipation, with stools of a light colour; the muscular energy lessens, and exercise is rather an ordeal. This is the critical period of the British-born tropical resident, and it depends partly upon the strength of body and of will whether he regains the normal, after the physiological maximum and minimum through which he has passed. If the organs of the body were sound to start with, in all probability no permanent damage will ensue; but if the digestive tract had been faulty before he left home for tropical life, there is a great tendency to real organic impairment. Should, however, a person starting even with healthy organs succumb to the lethargy which tropical life engenders, in all probability ill-health will soon overtake him. It is usually about two years after taking up residence in a warm country that effects of climate are manifested; and it depends upon the "soundness of wind and limb," and the strength of character of the individual, what the future is to be.

One of the most deterrent influences to the health of the white man in the Tropics is want of proper *rest and sleep* at night. This is induced by retiring too soon after a heavy meal, by restlessness due to heat, to mosquitoes, to the closeness consequent upon the use of the mosquito-net, &c. Whatever the causes—be they from external or internal influences—want of proper rest at night is a sure provocative of ill-health and of liability to contract disease.

Old and Young in the Tropics.

After a certain period of residence in the Tropics, most men become perfect sages in their wisdom of how to keep their health in a hot climate. Everyone is a hygienist unto himself, and is ever ready to impart his knowledge gained from personal experience. He watches his health intently; studies what he is to eat and drink as part of his day's work. Every man becomes a law and a physician unto himself, and by this method old residents in the Tropics can maintain their health in a truly wonderful manner. It is, therefore, not with the older residents the danger lies; it is the newly-arrived young man whose path is beset with danger. It is during the first five years of tropical life, therefore, that insurance offices run extra risks, and during that period, and that period only, that extra premium need be charged.

The younger the age at which a man proceeds to the Tropics the greater the risk of contracting disease. The chances of a youth of 18 to a man of 25 contracting disease are about 2 to 1; and to a man between 30 and 40 about 10 to 1. I never have any hesitation in recommending a healthy man of between 30 and 50 to proceed to the Tropics to take up work there; but I do my best to dissuade any one under 21 doing so. Every year of life over 21 lessens the chance of contracting illness, and a healthy man of 50 has a 50 per cent. better chance of combating the climatic effects and of remaining immune from disease than a youth under 20.

The Insuring of Young Men.

It is evident that for *insurance purposes* this is most unfortunate. A youth of 20 whose earning power is but little, and who to get his life insured has to pay an extra premium which may monetarily handicap him, is the very individual for whom an extra premium is most required. A man of, say, 30 or 35, who intends to take up work in the Tropics, is usually earning a larger salary, and the extra premium falls more lightly upon him; and yet the insurance office has, say, a 30 per cent. less risk.

Insurance Anomalies.

The insurance offices say, "Well, we slump the risks, and what we lose by the younger men we gain on those of more mature years." Many hardships are, however, incurred therefrom. But yesterday I saw a nurse proceeding to one of our colonies, a healthy woman of 40, who had to pay an extra premium of £10 a year; her actual salary amounting to about £60. I know also of *patients*, who, on being recommended to go to a warm climate by their physician, had to pay an extra premium to their insurance offices—a most anomalous state of affairs. They were being sent to the only place in the world where health could be obtained and where their lives could be prolonged, yet they are asked to pay an extra premium for their doing so.

I have known men who, after long residence in a warm climate, find they cannot keep their health at home, and go abroad again to live. They have paid an extra premium on their life insurance whilst abroad; this has been rebated when they came home, but again enforced when, in order to live at all, they have gone to the part of the world which suits them best; the insurance office in this instance remitting the extra premium in the only place where their client could not live, namely, at home.

What, then, are insurance offices to do, or what guide are medical men who know tropical life to offer them?

How to deal with the Insurance of Tropical Lives.

The insurance offices for the most part state: "We deal with each case individually; we have no fixed procedure for clients about to leave this country to take up residence in the Tropics." I offered a scheme for dealing with this problem in the *British Medical Journal* of June 12th, 1897, and although the insurance offices at the time condemned it as unpracticable, I see a number have adopted the principles I laid down. The principles of the scheme were as follows:—

"The Tropical Extra Premium.

"The following method of dealing with the extra premium demanded of a resident in the Tropics is suggested:—

"(1) After seven years' residence in a 'proscribed' country (that is, a region for which an extra premium

in charged by an insurance office) the extra premium should be reduced by one-half. This step to be conditional upon a certificate from the Company's Medical Officer that no permanent injury to health has been incurred, the expenses of such certificate to be borne by the insured.

"(2) That after ten years' residence in a proscribed region the extra premium to be reduced to, say, one-third of the original sum charged, provided a medical certificate be forthcoming that no permanent injury has been incurred.

"(3) That for the three following years one-fourth only of the original sum charged as extra premium be demanded, provided the requisite certificate be produced.

"(4) That after the thirteenth year of residence in a proscribed region no extra premium be charged, provided the necessary certificate be shown."

At the time I wrote the above I thought—and after some years of consideration I still think—that theoretically this scheme was a good one, but, like every scheme, it has its faults. The chief fault lies in the fact that a young man commencing life is called upon to pay an extra premium just when his means are small, a £10 increase in his annual premium is a matter of moment, and it may be altogether impossible for him to pay it. Ten pounds in rupees or Mexican dollars to a young bank clerk, for instance, is a serious sum, and I would like someone to devise a scheme whereby this hardship might be overcome. Let me suggest one.

An Alternative Scheme.

Suppose a young man of 18 insures his life for, say, £1,000, when he enters a merchant shipping office in the City of London. After two or three years in this office he usually has to go abroad to one of the offices of the company. Suppose he goes to Ceylon or Hong Kong, an extra premium of, it may be, £10 or thereby, is imposed upon him, a sum which it may be, and often is, quite impossible from his small salary to meet. To overcome this difficulty, I would suggest that the Insurance Company does not increase the annual payment but reduces the liability, say, from £1,000 to £750; or in the case of a more unhealthy region, say Mauritius or British Guiana, to even £500 for, say, the first five or seven years, and then, according to medical report, abate or reduce the restrictions. This would free the young man from increasing his payment and at the same time diminish the risk of the Company satisfactorily. I do not know if business men would accept the principle, but to me it seems feasible and fair.

It is said, I know not with what truth, that life insurance companies, even British companies, calculate upon policies lapsing as part of their assets. It is said to be part of the routine on which their business is founded that only one out of three policies reach "maturity" (if that is the correct word); and the lapsing of a policy is a distinct gain to the company. I cannot believe this to be true; it surely cannot be that any company can be legally (not to mention honour in the matter) allowed to take money from the public on such terms. That it pays a company to take money for a time, and then, through a quibble it may be, to hope their client may cease to pay them further, is a position in which any company or group of men may earnestly pray "that they be not led into temptation." Many young men, however, about to proceeed to the Tropics are monetarily hampered by the extra amount asked of them, or the extra premium may be altogether beyond their power to pay, and they have to allow their policy to lapse, much to the benefit, evidently, of the company. Comment on the equity, I think it is called, of such a transaction I would rather pass over, as I am neither lawyer, actuary, or business man, and evidently have no claim to be heard on the matter.

Certain Diseases not met with in the Tropics.

It must be remembered the commoner ailments one meets with in practice at home are seldom seen within the Tropics. *Scarlet fever* is unknown; *measles* is but rarely seen, although, of course, we are all familiar with a deadly outbreak in Fiji. *Small-pox* is as carefully warded off by vaccination amongst white people in the Tropics as at home. *Rheumatic fever* seldom occurs primarily within the Tropics, hence valvular diseases of the heart are rare. *Pneumonia* is uncommon: so that, viewed as regards the tendency to the more serious complaints prevailing in Britain, the Tropics would seem to be a sanatorium. In dealing with the deterioration of health in the Tropics, climate and disease both play a part. The climatic effects upon the new arrival I have already dealt with, and the condition a hot and moist climate induces, after say two years, tends to render the system less capable of resisting disease.

Chief Dangers to Life in the Tropics.

Excluding malaria, the alimentary tract and the abdominal organs generally suffer most markedly.

A healthy *heart* and *lungs* seem to be able to preserve their balance in a hot climate, and as these organs have usually been carefully inspected before the man has left home, it is seldom either cardiac or pulmonary troubles come within the ken of the medical practitioner in the Tropics. It is the organs below the diaphragm that give trouble. The young man who has come out at, say, the age of 18 is, after, say, two years in a warm country, very liable to digestive and bowel troubles—now constipation, now diarrhœa. A "chill"—that frequent cause of illness in the Tropics—may cause congestion of the liver, jaundice, or hepatitis, and the serious period commences. The physiological variations now become converted into pathological changes, and the future is uncertain. Dysentery may supervene, which, when it becomes more or less chronic or recurrent, necessitates a change of locality. The man is now an invalid, and may have to be sent home. If, however, he cannot afford to go home, he is patched up for a time and continues his work under adverse conditions.

Malaria, the other great bugbear of tropical life, is at hand in almost all warm countries. As, however, we now know that malaria is preventible, the dread of this scourge is lessening. Countries are classified as unhealthy according to their malarial infection; but

when our acquired knowledge is brought to bear on practical hygiene, malaria will lose its terrors.

No insurance company, I take it, would have insured the lives of Drs. Low and Sambon when they went to live in the Roman Campagna during the most malarial periods of the year, yet they came back without being infected and in excellent health. The mosquito-net was the sole protector. So it will be in all malarial lands. Any one can defy malaria who wards off the mosquito. And not only malaria, for the U.S. Army Commission have proved that yellow fever can be prevented in a similar manner. In the West Indies, therefore, where malaria and yellow fever are the scourges, there is no reason why one should contract either of these diseases. So keenly has this come home to us, that many declare that the Tropics are dangerous to the white man only through their diseases, not through their climate. Ward off malaria, and health is capable of being enjoyed in any climate. Whilst not, perhaps, going so far as to say that climate has no deleterious effect, I do claim that in the Tropics, if malaria can be prevented, the white man can resist the effect of a hot climate for an indefinite time.

It must, however, be remembered that malaria (the disease that renders countries unhealthy) is a disease that incapacitates much more frequently than it kills. The malarial patient becomes an incubus to his employer, but not a tax upon the insurance companies as a rule. He is invalided home or remains where he is until the initial effects of fever pass away and he becomes more or less immune. That his ailment may shorten life, if the tissue changes it induces are marked, there can be no doubt; but if he leaves the Tropics and comes home (it may be, for good) in all probability recovery is complete and the effect upon his length of days infinitesimal.

This brings up the question of the longevity of old tropical residents. We assume that they have passed through their initial malarial fevers and have adapted themselves to tropical life, with occasional changes, for, say, 30 years. Does this man when he comes home live as long as his contemporaries who have never been subjected to the ailments of tropical life? Unless there is marked organic changes (which, in the majority of instances of old tropical residents, there need not be), I do not think life is shortened, and that therefore the insurance office is the gainer by a 30 years extra premium charged. We see in the obituary columns of our daily papers notices of old tropical residents, civilians and military, who attain great ages, and who have, no doubt, passed through the ailments common to every one in the Tropics, and it must be within the knowledge of everyone in this country of cases of advanced age in returned tropical residents.

Diet in the Tropics.

I have said nothing about *food* or *alcohol* or manner of living. In most part of the Tropics good food cannot be had. The beef and mutton which are obtainable in most tropical countries are of a different quality to that which appears on British tables at home. Cattle are used as draft animals before being slaughtered; and the geographical distribution of sheep is such that the animals may have to be brought from a distance. In the region of the world I know best, namely, South China, there are no sheep; in Japan there are no sheep; and in many other parts of the Tropics sheep cannot live. It is easy, then, to believe that the food in many tropical latitudes has not the nourishing qualities it has in England, and in many places fresh beef and mutton of any description cannot be had. This is a prominent cause of "running down," and always a severe tax on digestive organs already upset by climatic conditions. No doubt, as inter-communication between the different parts of the Empire advances, cold storage will help to ameliorate the want of good meat to some extent; but in the meantime it is a serious factor in producing a tendency to disease.

Alcohol is a curse in the Tropics as at home, and its effects on economy are even more pronounced in a warm than in a temperate climate. The total abstainer has an enormous advantage in the Tropics from the point of view of health; and everyone who tastes alcohol in any shape before the sun goes down is certainly injuring his health.

Another point I would warn insurance offices against. One of the most trying periods in the life of an old tropical resident is the first year or two after he returns to take up permanent residence at home. Many men with the "tropical mask" upon them throw it off after a year or two. The parchment-like skin and the yellow tinge of the features pass away, and he rejuvenates wonderfully. But a certain number do not do so; fever hangs about them, chronic diarrhœa, &c., developes. Were I to advise an insurance office, I would say, continue the extra premium until after 12 or 18 months after their "life" has returned to Britain, or, unless under medical certificate of fitness, reimpose it should the extra premium have been rebated whilst abroad.

The Duty of Insurance Companies to the Empire.

Many of our large insurance offices tell me that they do not care to insure men going abroad to our colonies and dependencies. The business they desire is local, and most of them look askance at "lives" dwelling out of the British Isles. I do not consider this—what shall I say?—patriotic (for want of a better word.) I know the business men in insurance offices will scout any such idea as being chimerical, even quixotic; they hold that they are private companies doing their best for their shareholders, and patriotism has no part in their dealings. Like the shipping companies, they will sell their rights to benefit the shareholders, even if the ships are lost to the flag; or in the case of the Insurance Office the money passes into other pockets. In this we cannot altogether blame them, but I think the insurance companies of the country owe a certain duty to the State. They are allowed to accumulate vast sums of public money, and the State has a right to know that they are acting in the interests of the people. We are an Empire of scattered units, and the communication becomes more and more year by year. Business firms of any pretensions have their branches—or ought to have if the foreigner is to be kept out—in some one or in several of our colonies. Intercourse with our colonies is the essence of Imperialism, and everything

possible should be done to foster it. How, then, do these great public bodies, to whom so much of the nation's money is entrusted, play their part? One company, with the word "Cclonial" prominent in the name of the firm, write me that they "do not encourage insurance business with men proceeding to our colonies." Another of the largest of our companies writes me in the same strain; and all, except a very few, look askance at business with persons proceeding abroad. I think this is a serious reflection on any British Insurance Company. Think what it means. There is not in this audience a single man who has not a near relation or several relations residing abroad. The majority of insurances is taken out by the middle classes in Britain and it is from the middle classes that our business firms are supplied with men, and from which our Army, Navy, and Colonial Officers are drawn. The near relations (I go no further than brothers, sisters or first cousins) residing abroad number tens of thousands, and to almost each one of these an obstruction is placed to their going by insurance companies. If the insurance companies are to take their place in the imperial work before us, they must cease to be parochial in their notions and to remember that the State, having allowed them to accumulate a large part of the national wealth, requires of them national work. What is the consequence of their desire to "ca' canny"? The American companies step in. Soon after an uninsured Britisher sets foot in a colony, the omnipresent American insurance agent makes overtures, and more often than not secures a policy. The money goes to swell American coffers, and the British office—that is, Britain—is left all the poorer. And all this for what reason? Because British insurance offices have based their opinions as to the danger of modern life in the Tropics on "gossip" of 50 years ago, and they affect to believe in dangerous and unhealthy areas of the globe on insufficient evidence.

The Insurance of Natives.

The question of insuring the lives of natives remains a vexed one. British offices, for the most part, do not push this business; American insurance offices do. I am not prepared to give you a statistical table of the expectancy of life of, say, a Hindoo, Malay, Chinaman, or negro: no statistics are available; but I am prepared to give advice in regard to the matter. The question narrows itself down to a very fine point. It is only the more advanced and intelligent of the natives of any Asiatic country who take out insurances on their lives. It is the natives who have become "Anglicised" to a greater or less extent that usually come forward for insurances. But in the process of becoming Anglicised they have acquired more than an imperfect knowledge of English and British habits in business. They affect British ways of living to some extent, and especially do they take to the food and drink which they see supplied to the British table. Beef and mutton take the place of fish or fat pork in the diet, and European wines, especially champagne, are the constant concomitants of, say, the Chinaman who takes to European "chow." A rich Chinaman who affects the European mode of living has his Chinese "chow" with his family, and European "chow" (it may be immediately afterwards) with his Anglicised male *confrères*. The excess of rice at one meal, with beef, &c., and sweet champagne—the sweeter the better he likes it—in time tells its tale. Gout, kidney and liver troubles supervene, and his days are shortened. It is from this very class that most native lives are insured, and they are the very worst lives of the land they belong to. The ignorant and simple living native might be as good a life as any European—as a matter of fact he seldom is—but when he departs from his simple habits, and takes to "foreign" ways of eating and drinking, his life is not a good one. I saw much of American methods of dealing with the Chinese in regard to insurance. At one time in Hong Kong, the Chinese insured largely in American insurance offices, but during the last years of my stay there they almost ceased doing so. Perhaps they have taken it up again, but I hope on a different footing to that which was in vogue when I knew the methods followed.

The Effect of Rapid Communication.

The present rules and opinions which guide insurance offices in their work must have been—many positively were—formed when communication between Britain and her colonies was wholly or mostly by sailing vessels, and when railways in the interior of these possessions were unknown. These days, fortunately for tropical residents, are gone. When they fall ill the railway can convey them from the plains to the hills, and rapid communication by sea allows of a speedy change of climate either to home or to some salubrious spot. The extra-premium insurance charges are no doubt a considerable source of income and profit to our home insurance offices, and by laying them aside a loss might be entailed to the companies. What they lose, however, in this direction will be a gain in another and more useful manner to them and to the finances of the country generally, namely, by removing obstacles founded on an obsolete opinion, and encouraging young men to insure their lives in British in place of in foreign offices.

The Medical Officer of the Company the only Reliable Adviser concerning Tropical Lives.

I would recommend British insurance offices to rely for advice as regards the value of the lives of tropical residents on the medical officers of their companies and not on their actuaries. The actuary cannot know, he has no means of knowing, the effect of climate or the local state of healthfulness in any individual colony. The figures to his hand are misleading; the birth-rate is often far below the death-rate, and yet the population of the colony advances by leaps and bounds. The explanation of this is simple enough, namely, the importation of men—of coolies—labouring men in particular—who leave their wives and families in their native land. There are but few British colonies in which a native race can be studied as to its vital statistics with any degree of usefulness. In our colonies, I might say all our colonies, the importation of male native labour upsets the balance of the male and female population. The children are not born in the British colony, the men when they get ill leave the colony,

so that neither the birth-rate nor the death-rate give any indication of the normal. I naturally do not know every colony, but in most the instability of the population is a prominent feature, and the influx of young healthy men cannot possibly in any way help the actuary in coming to a conclusion, except an erroneous one, should he venture to base his knowledge on local statistics. Medical men are the best, I may say the only reliable, authorities on this subject. I would suggest that by this society a permanent committee of reference should be elected, who, collectively, would be able to decide what risk is entailed by a client of any insurance company proceeding abroad. It is impossible for any one individual to know the exigencies of climate in every sphere, but a committee of experienced men have means of ascertaining with some degree of precision what these really are. This advice I tender, not from interested motives, for I am not a member of this society, nor do I hold the post of medical officer to any insurance company, nor am I ever likely to be asked to do so, in view of my strongly expressed opinions concerning the duty of British insurance agencies in this country. I, therefore, have no axe to grind, except to do what I can for many persons on whom the extra premium presses hardly and unjustly, and to attempt to stimulate the insurance offices of Great Britain to realise their duty to the State by ceasing to hinder the unity of the Empire by callousness in their business, or by placing obstacles in the way of inter-Imperial intercourse.

CREDÉ'S OINTMENT.—A correspondent requests us to give the composition of this ointment. The formula is as follows: Argenti colloidalis (collargol) 15 parts; ceræ flavæ $8\frac{1}{2}$ parts; adipis benzoatis $76\frac{1}{2}$ parts (*i.e.* 15 per cent.) Collargol or colloid silver appears as a black granular powder, soluble in water—1 in 25. It may be given (1) by intravenous injection in doses of 20 to 50 milligrammes of a 1 or 2 per cent. watery solution; (2) by the mouth—15 grains for children, 30 to 45 grains or more for adults; (3) as Credé's ointment.

WARBURG'S TINCTURE.—This was originated by Dr. Warburg, a British surgeon stationed in India. He found that the antiperiodic effects of quinine were much enhanced through its administration in a mixture of bitter tonics, and formulated a tincture to be used as an adjuvant vehicle. The formula originally included aloes, which was found objectionable owing to its bitterness and to its cathartic effect, and was therefore subsequently left out; two formulas being in vogue, one with and another without aloes. The following is the formula of the National Formulary:—

Tinctura antiperiodica (sine aloe)—antiperiodic tincture; Warburg's tincture (without aloes)—

℞	Rhei et angelicæ sem.	aa	36
	Inula, crocus et fœniculi	aa	18
	Gentianæ, zedoariæ, agaric blanc, cubebæ, camphoræ, myrrhæ	aa	9
	Quininæ sulphatis		100
	Alcoholis dil. (U.S.P.)	q. s. ad	5000

—*Ind. Med Record*, March 11, 1903.

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THE

Journal of Tropical Medicine

APRIL 15, 1903.

THE CAMPAIGN AGAINST PLAGUE IN INDIA.

THE description published in this issue of the Journal of an attempt to destroy plague infection by the "desiccator system" devised by Dr. Sawhney, Chief Medical Officer, Jammu, will be read with interest. The Punjab Government have adopted the system, and a fair trial of the process is being afforded. Shortly, desiccation is carried out by a portable stove capable of being carried by two men. A room of about twelve feet square and its contents can be treated in an hour without inconvenience to the inmates of other rooms. Sawhney's plan of desiccation commends itself by its simplicity, by its celerity of action, and by its being seemingly rational. Whether further experience of this method of disinfection will prove its efficiency or failure remains to be seen, but we welcome the idea as a step in the right direction.

Heat, applied in any one of its several forms, we acknowledge as a potent and reliable disinfector, and radiation of certain gases through an enclosed area, combined with exhaustion of the foul air, seem to give us a logical, rational, and practical form of dealing with infected abodes. We have frequently, in this Journal, mentioned the Clayton process of disinfecting ships, and the very simplicity of the idea favours its adoption. In the Clayton process we have a circulation of air established by the most common-sense form of application, namely, an exhaust pipe to suck out the foul air, whilst at the same time an inlet pipe pours into the area a supply of specially prepared gas. The gas is the result of burning sulphur, and has been proved to be a mixture of SO_2 and SO_3, and its potency in destroying vermin and bacteria has been verified. We should welcome an application on the same principle for dwelling-houses. There should be no difficulty in so doing, and the plan recommended by Dr. Sawnhey would seem to be progressing on the lines indicated.

The reports from India as to the attitude of the natives towards aiding in the arrest of plague by the disinfection of houses are in some cases more hopeful than heretofore. Two years ago house disinfection was viewed askance and with distrust, but at the present time the citizens in several towns ask that the disinfecting gang be sent at once, and accuse the authorities of favouritism when the request is not instantly complied with, being jealous of their neighbours having their houses disinfected first. Experience has taught them the efficacy of disinfection, and they have also had it brought home to them that a house so treated is seldom reinfected. The area of India now infected by plague is so enormous, that unless the natives take kindly to some plan of checking plague, little can be done. Many, especially of the better-class natives, have learnt the value of evacuation, and when plague occurs in their village they do not hesitate to leave their dwellings and encamp in grass *chuppars* on a new site. Amongst the poorer classes, however, it is different: although most of them see the advantages of disinfection, they refuse to leave their houses except during the short time that the disinfectors are at work. Even this concession on their part, however, is an advance and of some service in arresting the disease, and it is to be hoped that in the future the compliance of the native will be so extended that the disease may be to some extent checked, even if it cannot be wholly eradicated.

Translation.

CLINICAL AND PATHOLOGICAL OBSERVATIONS ON BILHARZIAL DISEASE.

By Dr. Carl Goebel.

Translated from the German by P. Falcke.
Archiv für Schiffs und Tropen Hygiene, 1903, No. 3.

(*Continued from page* 109.)

The **symptoms** of bilharziasis are known too well to necessitate my describing them here. The report, however, of some researches, made systematically by me for a year and a half, to elucidate the simultaneous or sole occurrence of the eggs in the stool and urine, may prove interesting.

In this connection it must be mentioned that these examinations had necessarily to be frequently made, and often only had positive results after the administration of aperients. For this purpose calomel or Carlsbad salts suit best.

On examining the urine also, it will be found that notwithstanding the suspicion of eggs, none may be found. In such a case I advise the examination of the twenty-four hours' quantity of urine, or finally the results of the use of the catheter, more especially the few drops left remaining in it.

Bilharzia eggs were found twenty-four times in the stool, without being perceptible in the urine. Of these 24 cases, 8 were combined with demonstrable changes in the intestine; viz., growths in the rectum 5, in one of which eggs were found both in the stool and urine, catarrh of the rectum 1, polypus of the colon 1, and polypus of the colon with mesenteric tumour, 1. Twelve cases had secondary symptoms of other diseases (ankylostomiasis being frequent); 4 only could be regarded as bilharzial enteritis, the disease *sui generis*. In one case primary bilharzial enteritis was present in addition to bilharzial cystitis. The enteritis has a course resembling dysentery; therefore the expression bilharzial dysentery is also used. The stools contain blood and mucus or sanguineous mucus, or consisting only of these constituents. Such cases of bilharzial dysentery, however, are exceptional. In most of those cases in which eggs are discovered in the fæces, the stool is quite normal in appearance, and the odour is not particularly unpleasant.

Eggs in the stool and urine simultaneously were found twenty-five times. In 8 of these cases the patients had been admitted to hospital for other diseases (ankylostoma, dysentery, tuberculosis). In the other 17 cases the disease of the intestine was only severe

in 3 (1 rectal tumour, 1 bilharzial enteritis, and 1 case with polypus of the colon).[1] As to the remaining 14 cases, it was only the affections of the bladder caused by bilharzia (stone, fistula, tumour) that had led the patients to seek medical advice.

It will therefore be noted that of a total of 49 cases with bilharzial eggs in the stool, there were only 15 patients that exhibited other serious intestinal symptoms and had actual disorders of the intestinal tract.

Dissentient opinions have been expressed as to the **prognosis** of the disease. There are authors who do not consider it dangerous (Virchow, Allen, and many medical men in Cape Colony). Perhaps in some parts of the dark continent the disease is actually less deleterious than in other parts.

In regard to Egypt, be it noted, however, that bilharzial disease not only saps the strength even of children, but also causes adult persons, especially agriculturists, to die in the prime of life. The statistics of the Deacon Hospital from 1890 to 1901 demonstrate 97 cases of death in a total of 1,684 cases of bilharzia (including 235 doubtful cases) being 5·8 per cent., or, not including the doubtful cases, 6·8 per cent.

The fact, however, must be taken into consideration that a large number of patients leave the hospital in a moribund condition, or in a most miserable state, in order to be able to die in their home, a Mohammedan custom that it is difficult to combat. The causes of death were mostly attributable to the condition of the kidneys—nephritis, pyelonephritis, symmetrical hydronephrosis, uræmia; a few times death ensued from peritonitis after ulcerative processes in the bladder (stone) and kidney; septicæmia from urinary infiltration is often observed. The patients are frequently admitted into the hospital in an indescribably miserable, often dying, condition.

In this connection it should be mentioned that owing to our Hospital only occasionally admitting patients gratis, a relatively better class comes there than to the Government Hospital here, where one may observe still more advanced cases of the disease in natives so poor that they are deprived almost of the necessities of life.

I will now consider the **Treatment** of bilharzia. The inefficacy thereof is attributable to the impossibility of destroying the causal agents, the worms, in their hidden situations. The various vermifuges have been administered without effect. In regard to the general treatment of the patient, a tonic treatment with a good diet, iron, arsenic, &c., is to be adopted. Occasional doses of calomel, Carlsbad salts, &c., are decidedly useful in combating slight intestinal disorders, such as tenesmus and diarrhœa, and more especially bilharzial dysentery, *i.e.*, the voiding of mucus and blood with the fæces. Bilharzial cystitis is treated with salol, urotropin, milk diet; vesical rinsings are seldom attempted as they have frequently given rise to fever, rigors, or even pyæmia attacks.

In all the more serious cases decided improvement, if not cure, can only be expected from energetic surgical treatment.

Considering primarily the intestine, two eventualities may occur. First as regards the polypi of the large intestine and of the sigmoid, I have once performed extirpation of the descending colon and the sigmoid, being at the time under the impression that the case was one of multiple polypi on a simple adenomatous or carcinomatous basis. The difficulties were enormous, the vicinity of the intestine being permeated and infiltrated by eggs. The patient succumbed to post-operative peritonitis. Another time, at the urgent request of the patient, I made an exploratory laparotomy, and excised a piece of the connective-tissue of a retro-peritoneal tumour; the polypi could be distinctly felt in the intestine.

No good results ensue in such cases from surgical treatment.

In regard to the polypi of the rectum, extirpation is a measure not to be adopted, as the risk appears to be too great in proportion to the disease, and the frequent participation of the urinary system. The affection frequently goes so far up, that extirpation is entirely out of the question as regards the highest parts, and only the isolated polypi can be destroyed. This process is very easy, their pedicles being successively ligatured and the tumours then removed. These tumours are so soft, that the mere grasping them with an artery clamp suffices to enucleate them, or this may even be accomplished with a sharp spoon. The rectum is subsequently plugged with iodoform gauze, wound round a tube, along the lumen of which the intestinal gases may escape. Opium treatment for several days, then removal of the tampon and daily douching with solutions of boric acid, tannin, or nitrate of silver, quickly bring about improvement and remove the tormenting tenesmus.

Surgical treatment in the more severe affections of the uropoetic system consists of suprapubic or median lithotomy.

(*To be continued.*)

Reviews.

The Medical Annual.

Once more this hardy, useful and welcome annual has appeared. It is now twenty-one years since Messrs. Wright began to issue an Annual Report of progress in medicine, and with each succeeding year improvements have been apparent. The volume for 1903 is well up to date, and to the practitioner in the Tropics a book of the kind is essential. It is, in fact, the only book in the language which attempts to present the most recent advances in medical science in a form at once educational and practical; and therefore to medical men isolated from European Medical Schools or Societies more especially, the Medical Annual becomes a library of recent knowledge. Tropical medicine is granted a considerable space, constituting a compre-

[1] See Milton, "Notes on Surgical Bilharziasis, &c.," *St. Thomas's Hospital Rep.*, 1897. Milton has had good effects following the administration internally of methylene blue and washing out the bladder with creoline; he reserves cystotomy solely for severe cases of cystitis.

hensive bibliography of recent literature on the subject of tropical ailments and their treatment.

The volume for 1903 presents several new features each of which are of value, one of the most noticeable and useful being a chapter headed "General Review," at page 67.

It is often said of a book that no medical man can afford to be without it, and whilst employing this stereotyped saying in commending the Medical Annual for 1903, we repeat the phrase with all sincerity.

Médecine et pharmacie chez les Chinois et chez les Annamites (Medicine and Pharmacy of the Chinese and Annamites). By Dr. Julius Regnault. Paris: 17, Rue Jacob.

Everyone who has personal experience of the suspicious characteristics and secretiveness of Orientals must recognise the difficulty of the task the author has accomplished so successfully.

The Annamite methods of treating disease are only an imitation of the Chinese methods, and the author therefore has little that is original to report of Annamite medicine.

The medical "science" of the Chinese is founded on a number of standard works on pathology and materia medica, and has not advanced as in other countries, the Chinese doctors of the present period being very ignorant; they are not even required by Government to undergo an examination. Formerly some knowledge of anatomy was gained by *post-mortem* examinations, but now autopsies are no longer permitted.

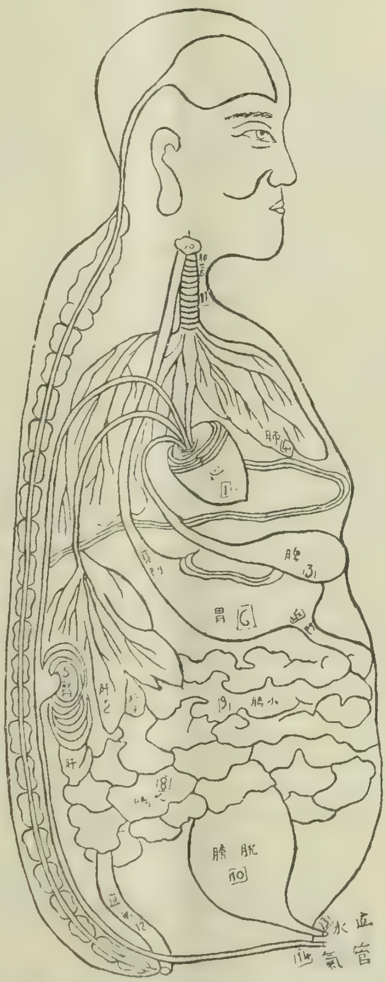
In the old text-books of China man is considered as a microcosm, the health of which depended on the harmony of two essential principles, the active and passive. All external and perceptible indications of disease have been carefully observed and described in the older books, but such methods of examination as percussion and auscultation are not known. The study of the pulse is exhaustive; it is felt at every accessible artery, and is the principle method of examination. The Chinese doctor differentiates no less than twenty-four kinds of pulse, the relation of which to the condition of the organs, constitutional peculiarities of the patient, and external conditions, is directly opposite to our ideas.

The Chinese pharmacopiæ is garnered from the vegetable, mineral and animal world. Medicines are made up in the form of drinks, powders and pills by chemists from doctors' prescriptions, and external applications are made up as powders, plasters, salves, &c.

The Chinese know the use of cupping glasses, alteratives, and massage.

Dr. Regnault describes the various diseases of the country and their treatment, such as cholera, plague, malaria, leprosy, and venereal diseases. The therapy in some cases is not unlike that of the West, and well-known expectorants, diuretics, narcotics and laxatives are used. We learn from the book that inoculation against small-pox has been practised by the Chinese since the tenth century, and that mercury has been used as a curative agent in syphilis for centuries. On the other hand, other medicaments lack the essentials of common sense and their effect is attributed to magic; of these, a powder compounded of the bones of fossilised dragons, pulverised tiger bones, and excrements of human beings and animals are the most common.

Chinese surgery is very deficient, the cause being attributable to the ignorance of anatomy. In fractures bamboo splints are used, and wounds are dressed with decoctions of tobacco and of other plants, and with ashes. Actual antiseptics are unknown.



The human body according to Chinese anatomists. Of the vessels leading from the heart, the lowest goes to the spleen, the next above to the liver, the next to the kidney, and the fourth to the body. The long duct leading from the region of the kidney past the rectum to near the urethral orifice is the spermatic canal.

The Chinese doctors are very reluctant to undertake operations, and the people, who are well aware of the inefficiency of their medical men in this respect, are glad to avail themselves, when necessary, of the assistance of European surgeons.

Chinese gynæcology is confined to a few sensible proceedings in the best-known abnormal presentations. The midwives have some elementary knowledge of the subject, but this is combined with a number of superstitious and very senseless measures.

The lower classes in China are intensely ignorant, and the medical superstitions practised amongst them are reminiscent of the witchcraft of the Middle Ages, but without the accompanying barbarity. Magicians and sages are largely consulted on matters medical by the uncultured masses, and even the so-called educated Chinaman is ready to seek their advice, especially when the "doctor" fails to relieve or cure.

Notes and News.

THE widow of the late Dr. Walter Reed has been granted a pension of £25 a month by the Senate of the United States. The pension was granted as a recognition of the eminent services of the late Dr. Walter Reed in connection with yellow fever investigations in Cuba.

MEDICAL COLLEGE FOR WOMEN IN CHINA. The Medical College for Women in Canton, which was formally opened on December 17th, 1902, continues to progress. When it is remembered that Chinese women are uneducated, even in the way and to the extent that the men in China generally are educated, it is a great advance in "modernity" that is now being witnessed in that country.

A WOMAN who had been posing as a plague goddess at Poona was found to be the wife of a man residing at Sawantwari, whom she left after a quarrel. She wandered about until she found her way to Poona, where she fell into the hands of certain men who deal in glass bangles. By these she was induced to pose as a goddess, and was apparently beginning to do a roaring trade, when the police appeared on the scene. Some of the wildest rumours concerning cures effected by her are still current.

Books Recently Issued.

COLONIAL AND CAMP SANITATION, by George Vivian Poore, M.D., F.R.C.P. Price 2s. Messrs. Longmans, Green and Co., London.

IMMUNITÄT, SCHUTZIMPFUNG, UND SERUMTHERAPIE (Immunity, Protective Inoculation, and Serum Therapy), by Dr. Adolf Dieudonné. Price 5 marks. Johann Ambrosius Barth, Leipzig.

MOSQUITOES AND MALARIA, by Frederick Pearse, F.R.C.S., M.R.C.P., D.P.H. Price 1s. 6d. W. Newman and Co., Calcutta.

ORIGINAL RESEARCHES IN THE TREATMENT OF TROPICAL DISEASES WITH INDIGENOUS DRUGS, by Hem Chandra Sen, M.D. Price 3s. The Record Press, Calcutta.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists, the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Blackwater Fever.

SCHWARZWASSERFIEBER [Blackwater Fever], by Otto Panse. *Zeitschrift für Hygiene und Infectionskrankheiten*, vol. xlii., No. 1.—The author has come to the conclusion that blackwater fever is the result of a combination of malaria with some other "foreign momentum." This foreign malarial is not necessarily quinine; it may indeed be some other drug. The actual cause of the hæmocytolysis is undoubtedly malaria, but only when it happens to come into juxtaposition with the second and still unknown factor. Practically, the fight against blackwater fever consists in combating malaria. Quinine prophylaxis, however, is only necessary for persons dwelling for a considerable period in a notoriously malarial region. The author for this purpose recommends Koch's method, *i.e.*, 1 gramme quinine every ninth or tenth day. There are healthy places in East Africa where a quinine prophylaxis is quite unnecessary.

Dysentery.

UEBER DIE PRIORITÄT DER ENTDECKUNG DES RUHRBACILLUS UND DER SERUMTHERAPIE BEI DER DYSENTERIE [On the Priority of the Discovery of the Bacillus of Dysentery and the Serum Therapy in Dysentery], by Dr. K. Shiga. *Deutsche Med. Wochenschrift*, No. 7, February, 1903.

AUS DEM BAKTERIOLOGISCHEN INSTITUT DER UNIVERSITÄT MOSKAU. ZUR ÆTIOLOGIE DER DYSENTERIE [From the Bacteriological Institute of the Moscow University. The Etiology of Dysentery], Preliminary Communication by Dr. L. Rosenthal. *Deutsche Med. Wochenschrift*, February 5th, 1903.—The author had eighty-five cases of dysentery under his care in the Alt-Katharinen Hospital of Moscow, between June and September, 1902. He systematically examined the stools, his mode of procedure being as follows:—

(1) Microscopical examination of fresh unstained preparations. Notwithstanding repeated examinations amœbæ were never detected in these.

(2) Microscopical examination of stained streak preparations made from particles of mucus mixed with blood. Short rods were often seen; cocci were not so frequent.

(3) Bacteriological examination. The investigator was in all cases successful in procuring a culture of pure bacillus identical with the Shiga-Kruse rods. The author was enabled to demonstrate the identity of the bacilli by the courtesy of Prof. Kitasato, who forwarded him specimens.

The micro-organism in question resembles a coli rod. It stains with aniline; Gram, negative; no intrinsic movement. No spore formation. Grows at 37° on all the usual media; gelatine is not liquefied.

Filaria.

FILARIA PERSTANS, by George C. Low. *British Med. Journ.*, March 28th, 1903.—We hope to reprint this paper in our next issue.

Leprosy.

REPORT OF THE HEALTH DEPARTMENT OF NEW ZEALAND (1901-2), by Dr. Malcolm Mason.—In this, the Second Annual Report of the Department, it is stated that out of forty to fifty cases of leprosy reported amongst the Maoris and other coloured people in New Zealand, two only were found to be leprosy; one of the lepers was a Chinaman and the other a Maori. The cases mistaken for leprosy consisted in many instances of syphilis or tuberculosis, or a mixture of the two diseases.

Liver.

AN ADDRESS ON SOME MISCONCEPTIONS WITH REGARD TO DISEASES OF THE LIVER, by W. Hale White, M.D. *British Med. Journ.*, March 7th, 1903.

THE EARLY DIAGNOSIS OF JAUNDICE, by Dr. Hamel. *Deutsche Med. Wochenschrift*, September, 1902, p. 702.—In the yellow races, and still more so in the darker coloured races, it is difficult or impossible to recognise jaundice from the skin tint in the early stages. The presence also of bile colouring matter in the urine is subsequent to the skin tint in white persons. Hamel, however, finds that bilirubin is present in the blood prior to the skin and urine being discoloured, and that by the examination of the blood, slight biliary obstruction may be recognised when even the skin, conjunctivæ and urine are to all appearances normal.

He also maintains that in prolonged cases of jaundice it is useful to examine the blood to ascertain if the disease is subsiding or advancing. Hamel's method of procedure is as follows: Puncture lobe of ear, draw off 15 to 20 drops of blood in a capillary glass tube four inches long, seal the ends hermetically with wax, stand tube upright with column of blood at lower end. In a few hours the blood separates into serum and clot. The colour of the serum may be compared with that of normal blood in a control specimen.

Malaria.

THE DIAGNOSTIC VALUE OF BLOOD COUNTS IN MALARIAL AND OTHER FEVERS, by Captain T. H. Delany, I.M.S. *British Med. Journ.*, March 28th, 1903.

Dr. Guerin (*Annales d'Hygiene et de Medicine Coloniale*, October—December, 1902) contributes a brief paper on the treatment of enlarged spleen with frequent attacks of malarial fever. He recommends subcutaneous injections of Fowler's solution (6 to 8 drops diluted by $\frac{1}{4}$ to $\frac{1}{2}$ cc. of $\frac{1}{10}$ solution of antipyrin). In cases where arsenic and quinine administered by the mouth are futile, one or two subcutaneous injections of the above are frequently efficacious.

Plague.

At Bangalore a series of fourteen experiments have been carried out by the Plague Department with Sawhney's desiccator, during February and March, 1903, with a view to ascertaining the actual results of desiccation in various types of native houses. The direct object of the experiments was to raise the temperature of each room to the extent in which the plague bacillus cannot exist, this condition being effected with dry heat up to 158° F., and moist heat (steam) of 122° F. The principles of Sawhney's desiccator is to draw the air into the lower or air chamber by means of a number of flues, from which chamber the air passes up into the upper or fire chamber, and from this again it is drawn out by means of a set of flues fixed in the lid. The various fuels used were dry cowdung cakes, called bratties, wood, charcoal and coal; the first two proving much cheaper than charcoal or coal. Pucca, or flat-roofed, houses gave the most successful results, owing to their being easily made air-tight, while tiled-roof houses proved unsuitable in nearly every case. There was a great smoke nuisance from the bratties and wood, which was not so marked with coal, and the fire risk was also greater, as flames protruded as much as two feet from the upper flues. The area which one desiccator can successfully heat was found to be from 8 feet to 10 feet, and the time occupied in establishing a successful result ranged from thirty to forty-five minutes with each quality of fuel. As compared with chemical disinfection, desiccation occupies a much longer time. Of fourteen experiments only five were completely successful.—*The Times of India*, March 28th, 1903.

UEBER DIE WIDERSTAND FÄHIGKEIT DER PESTBAZILLEN GEGEN DE WINTERKÄLTE IN TOKYO [The Power of Resistance of the Plague Bacilli to the Winter Cold in Tokyo], by M. Toyama. *Centralb. für Bakteriologie, Parasitenkunde und Infektionskrankheiten*, xxxii., No. 3.—The experiments were conducted in the months of February and March, when the temperature had fallen to 2·5 C. The vitality of the plague bacilli was not at all diminished by the cold, and in fact kept better than those in the incubator; for at a temperature of 37° the virulence of cultures was found to be considerably diminised by the fifty-sixth day, whereas those kept in the cold for three months were still virulent, though the growth was somewhat slower, and the low temperature had the effect of preventing the development of forms of involution.

Plague—Prevalence of the Disease.

India.—During the weeks ending March 14th and 21st the deaths from plague in India numbered 29, 997, and 29,236 respectively. In the city of Bombay the deaths amounted to 1,107 and 1,110, and in Calcutta to 895 and 751, respectively, during the weeks in question.

Cape Colony.—During the weeks ending March 7th and 14th the fresh cases of plague and the deaths caused by the disease were as follows: Port Elizabeth: fresh cases 11 and 3, deaths 4 and 2, respectively. King William's Town: fresh cases 4 and 1, deaths 1 and 1, respectively. Port of Table Bay: the ss. *Nevasa* arrived at the Port on March 3rd, with a case of plague on board. At East London and Graaff-Reinet, in addition to the above-mentioned towns, dead rats infected with plague have been found.

Hong Kong.—During the three weeks ending March

28th, April 4th and 11th, the fresh cases of plague in Hong Kong numbered 28, 66 and 25 respectively, and the deaths from the disease were returned as 24, 59 and 22 respectively.

Mauritius.—Since March 19th no cases of plague have been reported from Mauritius.

Screw Worms.

Screw Worms in St. Lucia, by St. George Gray. *British Med. Journ.*, March 28th, 1903.—The screw worm is the larval form of a small fly—the *Chrysomyia* (*compsomyia*) *macellaria*, Fabr. The worm attacks domestic animals as well as man in nearly all parts of North and South America, but it is mostly met with in the Tropics and Sub-tropics. Dr. Gray found the screw worm in the navels of young calves, in wounds in animals caused by barbed wire, &c. In human beings the screw worm was found in a sloughing ulcer in the upper lip, in axillary glands after amputation of forearm for malignant disease, in the vagina and rectum of a young woman, in discharge from the nostrils, and in a fetid ulcer of the foot.

The fly is about ½ inch long, the body being of a bluish-green colour, covered with stiff black hairs. It is differentiated by the presence of three longitudinal black stripes in the thorax. The fly deposits its mass of *eggs* in a wound of the body or on decaying matter. The eggs hatch in from one to nine hours. The larvæ are maggot-like, whitish in colour and active. They possess twelve segments each with a ring of minute spores or bristles, giving the worm the appearance of a screw. They burrow into any tissue or organic material from which they can obtain food, destroying even the bones, and many lay open the cranial cavity. In about one week they reach maturity, and leaving the dead or decaying tissues bury themselves in the ground to transform. From nine to twelve days they remain in the *pupa* stage, as a brown cylindrical body, with rounded ends. When freshly hatched the flies are at first brown, but change to blue or green after a short exposure to the air. *Prophylaxis* in animals is difficult owing to the wide distribution of the parasite; and in man, in whom the ova are believed to be deposited whilst asleep in the open air, mosquito nets offer a ready means of protection. Wounds should be protected from flies, and sores in which the worms are seen should be washed out with carbolic acid or creolin before being dressed. In the case of animals, after the wounds have been washed clean a dressing of pine tar or oakum and tar may be applied.

Typhoid.

The Neutral Red Reaction, by Mabel Fitzgerald and G. Dreyer. *Festskrift vill Jud. af Statens serum Institute*, No. 9, 1902.—Instead of the present method of differentiating the *Bacillus typhosus* and the *Bacillus coli* by the colour test, these observers recommend the employment of a 3 per cent. lactose bouillon, to which ½ per cent. of a 1 per cent. watery neutral red has been added. In from four to six days the *Bacillus typhosus* yields a yellow and the *Bacillus coli* a red colour. If the neutral red stain has been previously tested and found reliable the colour exhibited by these bacilli does not change.

Yaws.

The Treatment of Yaws, by Dr. Diesing. *Archiv. für Schiffs und Tropen-Hygiene*, April, 1903.—Tropical frambœsia or yaws (called buba by the Bantu negroes of East Africa) is of frequent occurrence in the neighbourhood of Lake Tanganyika. Dr. Diesing treated thirty cases in the course of eighteen months, and succeeded in permanently curing two cases which were not of a severe character, one of these being a man who exhibited two patches on his face, and the other a woman with an ulceration on the back of her hand. The treatment consisted of subcutaneous injections of the infected parts with a 30 per cent. emulsion of iodoform and olive oil, whilst the contiguous parts were painted with tincture of iodine for a protracted period. Dr. Diesing found that the subcutaneous injections of iodoform had the effect of quickly drying up the ulcerations. Two or three injections of a half cubic centimeter sufficed to cause desiccation of the ulcerations in four or five days. For a month at least the diseased parts of the skin must be systematically painted once or twice a day with the tincture of iodine, and it may be necessary occasionally to repeat the subcutaneous injections. Dr. Diesing found that the woman had no signs of relapse after eight months, and the man was still free after six weeks.

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The Journal of Tropical Medicine.

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Original Communications.

TROPICAL HYGIENE.

Lecture II.

Water Supplies.

By W. J. Simpson, M.D., F.R.C.P.

(*With Plate*).

Some of the Dangers and Difficulties connected with Water Supplies in the Tropics.—Pure water for drinking purposes is a commodity not easy to obtain in the Tropics. The reason of this difficulty is mainly due to the pollutions to which the water is subjected by the customs of the people, and it is largely owing to these pollutions that microphitic and parasitic diseases are rife. There is not only a greater variety of disease germs and helminthic parasites in warm climates, but the conditions are such as to allow them to flourish in greater luxuriance. Drinking of impure water in a temperate climate is liable to produce enteric fever, disturbance of the bowels, and possibly worms, while the drinking of impure water in the Tropics is not only liable to produce these diseases, but also cholera, dysentery, filariasis, bilharzia, guinea-worm and a host of other parasitic affections.

The supplies of drinking water in the Tropics are similar to those in other parts of the world. They are rain, river, lake, spring, well and tank, all being primarily derived from the rainfall. On the ocean, in rainless tracts, and in regions where the rainfall is scanty, or where there are only salt lakes, the drinking water is frequently obtained by distillation. This is the means of supply to the troops and European residents at Aden, where the wells are brackish and where rain may not occur for several years; the sea water is distilled and used for drinking purposes

The Romans, when they occupied this promontory on the Arabian Coast, built large reservoirs at the foot of the hills, and conveyed to them by artificial aqueducts, constructed on the hill sides, the rain which fell at infrequent intervals.

In Australia, in some of the mining districts, such as Coolgardie, the rainfall is very scanty, and drinking water until recently was obtained from the salt lakes by distillation. The water was placed in large tank boilers, to which were attached pipes leading into expansion tanks which were connected by pipes with receivers. The condensation or cooling of the vapours was effected by exposure of the pipes and of the expansion tanks to as much air as possible. By this method considerable quantities of water were obtained, not in the same quantities as we are accustomed to in England, but two gallons of water per head per day, which was found sufficient for the wants of the miner.

Distilled water is also used on men-of-war and on other vessels when the ordinary supply which has been obtained from the shore has run short or is unfit for drinking. The distilled water is obtained from sea water by means of Normandy's condenser, which at the same time aerates the water during the process of condensation. As distilled water is flat and unpalatable, aeration of the water is an important process which should form part of the plan in all methods. On board a man-of-war five gallons per head per day is used, but this does not include the quantity of sea water used for sanitary flushing and deck washing.

In many countries there is no difficulty in obtaining plenty of water by storage from the rainfall, which is abundant, or by a supply from rivers and streams or springs or wells. In other countries it is not a matter of so much ease; still, even in the most unpromising countries it is seldom that water cannot be obtained by boring, if that boring is guided by some degree of discretion as to where it is to be carried out. In many parts of South Africa, though the rivers are waterless, and at a certain time of the year the surface of the land is arid in appearance, consisting of ironstone, shale and limestone, formed into abrupt and steep rocky hills or kopjes and extensive plains, yet there are few parts

in which a boring, if put down by one who has closely observed the general physical features of the country, its lie and its main lines of natural drainage, will not soon strike water under the surface. There are some points which should be borne in mind in the search for water in an unknown locality. Water is more easily obtained in a hilly country than in a plain. The depth of water in the plain depends on the permeability of the upper layer of soil and its thickness before reaching the impermeable stratum which supports the ground water. Any part below the general surface level should be selected for experiment with a driven well.

Water can usually be found under waterless rivers, under the dry courses of nullahs, at the junction of ravines and of valleys, and at the foot of hills, but not of spurs; secondly, in places where there is much vegetation and verdure, or where the water shed is well wooded, which prevents the rain from passing too rapidly over the soil to the water courses. A country cleared of its timber loses its permanent streams, and is subjected to floods and drought. Finally, in the event of their being no vegetation, particular localities over which fogs or swarming insects are noticed in the morning, usually indicate water near the surface. If there is any geological fault in the district it is likely that springs will be found along the line of faultage. The dip of the strata and the general fall from the watershed should, if possible, be observed.

In selecting a camping ground which is likely to be in use for a considerable time it is important that the water supply shall be permanent. This will likely be the case if the springs are at the foot of hills. Springs are more likely to be found in limestone districts, where the carbonic acid gas in the water acts as a solvent on the rocks, and allows these springs to be fed from subterranean reservoirs. Chalk districts usually have few springs unless the level of the locality is considerably below its surroundings. In sandstone districts abundant water is often obtained from deep wells.

The ordinary sources of water supply for drinking purposes may be divided into three groups:—

(1) Rain water.

(2) Subterranean water. (*a*) *Ground water*, shallow wells and a few springs; (*b*) *deep-seated water*, deep wells, artesian wells and most springs.

(3) Surface waters, such as rivers, lakes, ponds and tanks.

Rain water is a very frequent source of supply, more especially where the rainfall is heavy and the springs are brackish. The rainfall varies greatly in different localities. To take two extreme instances: The rainfall at Cherrapungi in the Himalayas, which amounts to 600 inches in the year, is in striking contrast to that in the rainless tracts of the deserts in various parts of the world. Between these extremes there is every range. The uncertainty of the rainfall in some localities, the length of the dry season, and the large size of the cisterns which then have to be employed, are disadvantages against the use of this source as a supply.

There are *two methods* of collecting the rain; one is receiving it off the roofs into vats or storage tanks; the other is receiving it on a large area of ground which has been rendered impermeable by a covering of slate, concrete or cement, and from which the rain when it falls is conveyed into underground tanks or reservoirs. Of the two methods, that in which the rain is collected from the roof is the most general.

In localities in which there is a fair rainfall, and not too long a dry season, rain water, owing to its purity, aeration, freedom from earthy salts, and absence of liability to be contaminated by reason of its not passing over or through the soil, is palatable, healthy, and well suited for domestic purposes. In determining the amount of water available it is necessary to know the annual amount of rainfall and the superficial area on which the rain falls. In the case of the amount of rainfall this is ascertained by the rain gauge, and the supply which is available from a given roof can be roughly estimated by taking the external dimensions of a building, multiplying them together and multiplying the product by half the rainfall in inches. The result is in gallons, and is not more than 4 per cent. out of the correct amount.

Methods of Storage of Rain Water.—At one time in Calcutta the rain which fell on the flat roofs of the houses was conveyed into large earthenware vessels, in which it was stored for domestic use. In Venice until lately, and even now, the rain water which falls on the roofs of the houses and courtyards and streets is allowed to run into underground cisterns, and forms the supply for drinking purposes. These cisterns are made by excavating the soil and lining the reservoir so formed with brick and puddled clay. A brick well is then built in the centre, openings being left at the bottom. The reservoir outside the central well is filled with fine sand. By this means the rain water which is admitted into the reservoir is filtered before it reaches the openings where it can rise in the well. Owing to this filtration and to the fact that there are no draught animals to defile the streets of Venice, the water in the wells is comparatively pure.

In Buenos Ayres the supply used to be rain water conveyed from the roof of the houses into underground tanks, a method adopted in many places. In Jerusalem there are under the houses large stone vaults or reservoirs into which the rain water from the roof is conducted. Some are provided with sand filters, from which the clear water runs into covered wells.

In Demerara the rain falling on the roofs of the houses is conducted into large vats which are supported on pillars. In South Africa a similar mode of storage is common. There are huge corrugated iron tanks to be seen alongside the house, which receive the rain water from the gutters on the roof. In estimating the size of the cistern the following points have to be borne in mind: (*a*) The amount of water required daily; (*b*) the least, greatest and average rainfall; (*c*) duration of rainless season. The average of twenty years less a third, gives a very fair estimate of the amount of rain in the driest year. The average of the three driest years should form the basis of calculation; and it may be taken that six-tenths, or perhaps safer only half, of the rainfall is available for storage.

Rain water is the purest of water if it is received on a clean surface, but in warm countries, where dust storms are frequent, the roofs of houses are generally

polluted with vegetable matter from leaves, animal matter from the excrement of birds, and dust containing both animal and vegetable matter from the roads. These matters washed into the tanks soon affect the quality of the water, giving it an unpleasant taste, and in some instances causing disease. It is desirable, therefore, that as far as possible impurities from the roof shall be prevented from gaining access to the tank. With this object contrivances have been made which reject the first washings off the roof, and then afterwards direct the flow into the tanks.

One of the most common contrivances is the leaping weir, which takes advantage of the circling and leaping character of the flow of water mixed with mineral and other substances, and permits the worst contamination water to flow past the tank. This arrangement, however, is less effective than small receiving tanks operating a float and plungers, which when the tank is full diverts the flow of water into the storage tank. Of English apparatus there is Roberts' and Gibbs' rain separator, but they are very apt to get out of order and are useless at the time when most required.

Situation and Kind of Storage Tanks.—The situation and the kind of tank in which the drinking water is stored are important matters for consideration. The tank is best to be placed above ground and on a platform. Each gallon of water, at a temperature of 60° F., weighs about 10 lb. The tank should be under a roof to protect it from the sun, in order that the water may be kept as cool as possible, and also to exclude light to prevent the growth of vegetation; it should, moreover, be covered, in order to prevent dust, insects, rats, and other objectionable things from gaining access. With the knowledge now gained as to the *rôle* of the mosquito in acting as the intermediary host of the malarial parasite, it is obvious that in all malarious countries reservoirs for the storage of water should be protected from the mosquito. It is usual to find the water butt full of mosquito larvæ. This can easily be avoided by mosquito wire-netting covers, which at the same time prevent other insects getting into the water. When the reservoir or tank is underground care must be taken that there is no leakage into it, and care should be taken always whether above or below ground, that the overflow pipe discharges freely into the open air and not direct into a sewer. It is important that the reservoir be situated in such a position as to be easily inspected, and that it shall be of such construction and size as to allow of its being completely emptied and cleaned out. There should always be at the lowest part of the tank an arrangement by which all the water can be drawn off and the tank thoroughly cleansed. Whether the tank be above or below ground the water from the roof should be conveyed at first into a filtering reservoir containing three or four feet of sand and gravel, and thence into the cistern or tank. The filtering reservoir should be covered, and the sand or gravel should be changed before the rains. All cisterns should be periodically inspected and cleaned. Vats of wood are objectionable because they are subject to decay, and to be covered, too, with vegetable growth. Lead cisterns should never be used to store water, and especially rain water, which on account of its softness has a peculiarly absorbent action on the lead, which even in the smallest quantity is poisonous. Concrete, cement, slate, and stoneware reservoirs are good, and so are corrugated iron tanks. Perhaps the easiest of construction are tanks made of bricks laid in cement. Common mortar should not be allowed to come in contact with the stored water, as lime is readily taken up by the water. In all cases rain water stored in this way should be boiled or filtered before being used as drinking water.

Subterranean waters form another source of water supply. When rain falls on soil which is permeable and which is more or less horizontal in the arrangement of its layers, the water percolates down to the first impermeable layer, where, not being able to get lower, it forms a reservoir called the underground or soil water. When the layers are not horizontal, but inclined and dip down deep into the earth, the water falling on the outcrop, or that part of the layer which comes to the surface, passes down to greater depths, underneath the impermeable layers near the surface and there form deep subterranean reservoirs.

Accordingly, the underground reservoirs are not all at the same depth, and there are usually a series of reservoirs one under the other, nor is the most superficial reservoir always at the same depth. Their formation depends on the permeability of the soil on which the rain falls, the thickness of the permeable soil, the amount of rainfall and the presence of an impermeable layer holding up the water. They may be quite close to the surface or at some considerable depth.

Wells and their Classification.—There are several kinds of wells, such as shallow wells, deep wells, and artesian wells. *Shallow wells* are those which tap the underground water, overlying an impervious stratum. *Deep wells* are those sunk through an impervious stratum and tap the deeper water-bearing strata. *Artesian wells* are those which are sunk through impervious strata down to a water-bearing stratum in which the water is under sufficient hydrostatic pressure to be forced to the surface when the well is formed.

With this classification shallow wells may be of considerable depth, depending on the thickness of the water-bearing stratum, the height of the underground water and the depth of the underlying impervious strata. They may vary from two or three feet to fifty or more feet in depth. Deriving their supply from the ground water, the pumping of a shallow well affects the ground water in every direction for a measurable distance. This *circle of influence or of drainage* increases with the demand upon the well, forming a cone having its apex at the well water and its base on the surface of the underground water. The radius of the base varies in different soils. In those soils that allow of a free passage of water, such as coarse gravel, the distance may be 100 to 200 times the depression in the well. In fine sand it may be only 20 to 40 times the depression.

Sources of Contamination of Shallow Wells.—A cesspool, privy, or other contaminating agent within the circle of drainage is likely to be dangerous. The cesspool may thus drain directly into the well. If the amount of liquid filth escaping from the cesspool is too small to drain directly into water supplying the well, but

only pollutes the soil above it, the amount of filth in the soil is apt to be washed into the well on the occurrence of rain. This explains why some wells are noticeably bad after heavy rains, while at other times the water seems to be good. On the other hand, when there is a more direct passage of filth into the well heavy rain may so dilute it as to cause the water to be purer than in dry weather.

The circle of drainage is not always the circle of possible contamination. The movement and direction of the ground water is important. If any offensive matter pollutes the underground water as it flows towards the well it will be dangerous, whereas pollution occurring after the underground water has flowed past the well causes no danger to that particular well.

A rise in the underground water after heavy rains may also reach pollutions which at other times were beyond the reach of the well.

Other sources of contamination are from the surface. The well is frequently placed on the lowest ground and the surface drainage is permitted to flow into it. In India the mouth of the well is the favourite spot for ablution, and it is not infrequent to see one person drawing water for drinking purposes while another is performing his ablutions, and the soiled water is flowing back to the well. The same is to be seen in China, though here the impurities are unlikely to be so great from this source, as the Chinese do not wash to the same extent as the Indians, and the effect of the impurities is lessened by the habit of drinking tea instead of water.

The Objections to and Dangers of Shallow Wells.—The great objection to shallow wells is their liability to pollution by cesspools and by surface drainage, and by their consequent liability to specific pollution. A large proportion of the outbreaks of typhoid fever recorded is due to the use of shallow wells. Of 205 epidemics of typhoid fever in Great Britain and Ireland, prepared by the late Mr. Ernest Hart, nearly two-thirds were due to the use of ground water, and nearly all of these were due to the use of water derived from shallow wells situated within a few feet of defective cesspits, cesspools or sewers. The liability to pollution of many of the wells in Great Britain and Ireland is undoubtedly great, but it is immeasurably greater in the Tropics. In the East there is no sense as to what a pure water means. The cleanest individual who will not be satisfied unless he washes himself several times a day will have no compunction in drinking water of the most impure kind. The wells are contaminated in the Tropics by cesspool pollution and by surface contamination. In many places cesspools are quite close to the wells, and when one cesspit is filled another is dug. Before Buenos Ayres was drained and a water supply given to the town, the cesspits at the back of the house, and only a few yards from the rain-water reservoir, or well in the court-yard, used often to be so numerous that it was not safe to walk across the back-yard.

The construction of cesspits of any kind is often too much trouble; in that case fæcal pollution is generally caused by surface drainage into the well, which is contaminated by the contents of the privies or drains, which when full are emptied on to the garden or ground near the well. This was the position of affairs in Bloemfontein before a public water-supply. The situation of wells and their liability to surface pollution are well depicted in the accompanying drawings. These are average samples of what may be seen any day in different parts of India and Burmah, or, as a matter of fact, in any part of the world.

Universality of Contamination of Wells.—My experience leads me to the conclusion that much the same kind of wells, and more or less the same kind of contaminations, are to be found in every part of the world.

Dr. Christie, in his book on "Cholera Epidemics in East Africa," describes the kind of wells from which water is supplied in Zanzibar: "These pits," he says, "are simply excavations in the sandy soil to about the depth of ten feet or more, gradually narrowing towards the bottom, and generally situated on a sloping ground. There is seldom during the dry season more than a few inches of water at the bottom of these pits, and around the top about thirty or forty women are squatted with their water jars waiting for the percolation of the water. This, one after the other, they ladle into their water jars by means of a cocoa-nut shell fastened to a long stick, and this work generally occupies two or three hours. Meantime the gossip goes on, and the border of the pit is used as a convenience. The negress water-carriers are extremely lazy, and they will not trouble to fetch good water if it deprives them of their customary gossip round the well. I need not add that Zanzibar under these conditions is extremely unhealthy." This condition of pollution, however, is not uncommon wherever the African negroes are left to their own devices.

Wherever one goes in the Tropics it is important to see that the drinking water is not, as it is most likely to be, a liquid solution of filth, having as its polluting sources grave-yards, excrement, and decomposing animal and vegetable matter.

On inspecting a well the proximity of burial grounds cesspools, sewers, latrines, surface drains, manured fields, and filth nuisances, should always be borne in mind as possible sources of pollution. In India and in Mahommedan countries burial grounds are usually so numerous and kept in so insanitary a condition that they are a considerable danger to the well water.

Tube-Wells and their Advantages in the Tropics.—It is because of the general surface defilement and the peculiar habits and customs of the coloured races of the Tropics that Norton tubewells, or Abyssinian wells, as they have been called, are so useful. I consider that they overcome most of the dangers which are apt to arise from an ordinary shallow well, and, if care is taken as to the situation in which they are placed, a supply of good and pure underground water may be obtained which would be almost impossible with an open well. They have a further advantage, that it is impossible for mosquitoes to reach the water contained in them. The tube-well may be made to tap the ground water overlying the first impermeable stratum, or it may be sunk below the impermeable stratum to a second water-bearing stratum and tap the water contained in this. The tube-well consists of an iron tube or pipe of $1\frac{1}{4}$ to

4 inches in diameter, having at its lower end a wrought-iron or steel point. Above this point the tube is perforated for some distance to admit water. At its upper end it is so constructed as to allow of another tube being coupled on to it. The tube-well is driven into the ground by a weight arranged on a tripod. When the top of the first tube reaches the surface a second is joined on, and so the driving and joining on of tubes are continued until water is reached. A pump is then attached to the top of the tube. The pump will yield about seven gallons per minute. The water at first pumped up is muddy, but if the pumping is continued it will clear as the *débris* is brought up; the yield of a tube-well may be taken as follows:

Size of tube in inches.	Gallons per hour.
1½	150 to 600
2	300 „ 1,200
3	600 „ 2,400
4	1,200 „ 4,400

In America and in some parts of India several tube-wells are connected, and in this manner a large supply may be obtained. These tube-wells prevent pollution from any surface contamination, and as such they are most useful. In order to prevent possible leakage down the outside of the tube, a small ring of cement may be made at the surface. One great advantage in the use of tube-wells is that they can be shifted from place to place, and are thus exceedingly useful in ascertaining where sweet water is obtainable, which is often difficult in localities where sweet and brackish waters are near one another.

Another form of tube-well is the bore well made by a diamond drill or jumper worked either by hand or by steam. The diamond drill or jumper is used for sinking bore-holes through hard soil or rock.

The advantages of a bore-hole are:—

(1) Freedom from surface contamination.

(2) Natural filtration.

(3) Rapidity in sinking. The average of sinking an ordinary well of about 6 feet in diameter is 3 feet per 24 hours, whereas with a bore-hole the average is 28 feet during the same period.

(4) A greater quantity of water is obtained by sinking a bore-hole than by sinking a well.

In an ordinary well when the superficial water is tapped the deepening of the well is generally abandoned, owing to the inrush of water being too great to allow of the continuance of the work, and consequently it is usual to be satisfied with the superficial supplies.

Protection of Wells.—If water is to be taken from *shallow wells*, the ground-water level should if possible be not less than 12 feet from the surface, and the ground on which the well is situated should be quite clear around for at least 100 feet.

Wells should be lined and cemented, so that no surface water can enter without having first filtered through a certain depth of soil. They should be further protected from surface drainage flowing in at the top by having around them a raised parapet, which should be covered to prevent light or dust getting in. A suction pipe should be provided, not immediately over the well but at the side, the pipe attached to the pump and the well being so arranged as to admit of this. The ground near the mouth of the well becomes dry in the summer, and is apt to crack and get fissured, allowing unfiltered water to leak into the well. This may always be avoided by concreting a certain portion round the well and sloping it away from the well.

If a pump is not used, but cattle are employed for drawing the water, the circular path on which they travel must be drained away from the well and kept clean.

Another method of protecting a shallow well from pollution is to provide it with an iron pipe, which shall reach from the bottom to the top of the well, then fill the well up to the highest water point with pebbles and gravel, and the remainder to the surface with sand. The well can be thus turned into a tube-well, with the advantage of its lower end dipping into a layer which gives no resistance to the subsoil water. The pump, as in the other case, should not be erected immediately over the well but at some distance from it, which will prevent the water of the well, when used for washing and other domestic purposes, leaking back into it and rendering the water foul.

In deep wells and springs the filtration through the soil has been so complete as to render the water very free of organic matter. The same care has, however, to be taken as regards drainage from surface defilement flowing in at the top of the well. Besides the immediate surroundings of a deep well being carefully protected, attention should be paid to the sanitary condition of the outcrop or gathering ground, which is likely to be at some distance from the well.

Artesian wells have had their water filtered through such a depth of soil that their waters are very pure. They are used in many places in the East. In Pondicherry there is a very deep well, and it is due to the purity of its supply that Pondicherry is so free from cholera. In Java there are a number of Artesian wells, some of them being sunk on the sea-shore underneath the sea. Since their introduction cholera has lost its epidemicity in Java. In Queensland many artesian wells have been sunk, and supply large quantities of water in localities which were formerly waterless. They are often 1,500 to 2,000 feet in depth.

Methods Employed for Discovery of Suspected Sources of Contamination.—It is important, when a well water is found by analysis to be polluted, to discover the source of the contamination, which may be situated at a considerable distance. For this purpose certain substances are used at the suspected source of pollution, and are afterwards looked for in the contaminated water. It is necessary to examine the water first to ascertain that there is not naturally in it any of the substances to be employed in the test. The same process is of service in tracing the course of underground streams, leakages, &c. Common salt, chloride of lithium, and fluorescin are the chief soluble substances employed.

If common salt is employed it is detected by the extra amount of chlorine in the water, shown by the nitrate of silver test. The lithium chloride is traced by the crimson lithium flame or by the spectroscope, which is extremely delicate in detecting minute quantities of this salt. The water must, however, be tested

first to ascertain if there is naturally present any lithium. Fluorescin, which is an orange dye with a very remarkable green fluorescence, is an excellent agent. It gives the green fluorescence, however, only when the solution is alkaline, so that soda or alkali should be added.

Of solid substances used, Prussian blue, bran, starch, and other finely-divided solids are the most common to ascertain whether water has undergone proper filtration.

If there is any suspicion that a cesspool, leaky drain, manure heap, or any other possible source of contamination drains into a well, the suspicion may be converted into a certainty by using a quantity of salt, chloride of lithium, or fluorescin, and afterwards examining the well water for these substances. In determining whether the sewers of Calcutta leaked into the subsoil water in which there were wells supplying drinking water, I found that the introduction of chloride of lithium into the sewers caused the water in the subsoil and adjacent wells to give the spectroscopic band for lithium, which was absent previous to the experiment. Sometimes the source of contamination of a polluted well is discovered accidentally. Instances have occurred in which, owing to sickness in the house, carbolic acid has reached the cesspool and from there percolated into the well, so that the first suspicion of anything being wrong with the well has been the taste and smell of carbolic acid in the water.

EXPERIMENTAL HÆMOGLOBINURIA IN A CASE OF BLACKWATER FEVER.

Under the care of Dr. Patrick Manson, C.M.G., *at the Branch Seamen's Hospital;*

Reported by W. G. Ross, M.D., M.R.C.S., *and* George C. Low, M.B.

Inability to take quinine is a bar to residence in highly malarious countries. Therefore idiosyncrasy in the direction of quinine hæmoglobinuria is a definite indication against return to West Africa. When the patient (who is the subject of the following notes) declared that quinine always gave him blackwater and we were requested to advise his employers as to his future for further service in West Africa, and as he expressed willingness to give a demonstration of the fact, his offer was accepted, partly in his own and his employers' interests, and as an object lesson for the students at the London School of Tropical Medicine.

T. R., aged 25, *English*, last from the Gold Coast Colony; admitted March 19th, 1903.

Previous History.—Went to Gold Coast in June, 1901; had first attack of fever in January, 1902; it was not severe and he was not laid up; had three similar attacks up to September; was always treated with quinine, 10 grs. at a time, and also took this dose irregularly at considerable intervals as a prophylactic.

In October, 1902, had an attack of blackwater fever; the first symptoms led him to believe that he was about to have an attack of malaria. He took 10 grs. of quinine at 5 p.m. one evening (did not remember the date). About midnight he had vomiting, diarrhœa, and frequent micturition. He noticed that his urine was black; he was attended by a doctor who stated that his temperature at one time was 107°; he was in bed three days and was deeply jaundiced. The blackwater passed off in twenty-four hours; he had no further attacks in Africa and arrived home early in March.

On March 11th, feeling chilly and feverish, he took 10 grs. of quinine at 7 p.m.; at midnight diarrhœa and vomiting set in and he began to pass black water. All symptoms disappeared in the morning; he consulted Dr. Manson, who sent him for observation to the Branch Seamen's Hospital in connection with the London School of Tropical Medicine.

State on Admission.—Temperature 99·6°; is anæmic; spleen enlarged; not tender.

Blood Examination.—No malarial parasites; no pigmented leucocytes.

Blood Count.—Red corpuscles, 3,425,000; leucocytes, 10,000; hæmoglobin (von Fleischl), 65 per cent.

Differential Leucocyte Count.—Polymorphonuclear, 59 per cent.; large mononuclear, 18 per cent.; lymphocytes, 21 per cent.; eosinophiles, 1 per cent.; mast cells, 1 per cent.

On the following day the temperature was normal and he felt quite well; he remained so until the 23rd, when Dr. Manson decided to test his statement that quinine gave him hæmoglobinuria. His blood was examined during the day and gave—red corpuscles, 3,635,000; leucocytes, 7,000; hæmoglobin, 65 per cent.

At 9 p.m. he was given the 10 grs. quinine by the mouth. He slept until 1 a.m. when he had a moderate rigor, nausea, and diarrhœa, and passed a large quantity of black water. His temperature was 99° at 2 a.m.; in the morning his urine began to clear and by 7 p.m. was pale yellow; his temperature then being 99·8°.

The examination of the black sample of urine showed one-third albumen, methæmoglobin crystals, and a few hæmoglobin casts; the spectroscope also showed methæmoglobin.

Blood Examination, 11 a.m.—Red corpuscles, 3,000,000. leucocytes, 10,000; hæmoglobin, 59 per cent.

Differential Leucocyte Count.—Polymorphonuclear, 77 per cent.; large mononuclear, 8 per cent.; lymphocytes, 13 per cent.; eosinophiles, 1 per cent.; mast cells, 1 per cent.; thus showing a loss of over half a million red corpuscles in a few hours.

On the 25th his anæmia was marked and he was slightly jaundiced.

Blood Count.—Red corpuscles, 3,000,000; leucocytes, 11,800; hæmoglobin, 57 per cent.

Differential Count of Leucocytes.—Polymorphonuclear, 56 per cent.; large mononuclear, 21 per cent.; lymphocytes, 20 per cent.; eosinophiles, 2 per cent.; transitional, 1 per cent.

On the 26th, daily hypodermics of 15 minims of Squire's arsenate of iron were ordered, and on the 27th euquinine, grs. 2, three times daily. His progress was favourable, but his blood regeneration was slow.

On the 30th the *blood count was*—red corpuscles 3,320,000; leucocytes, 6,200; hæmoglobin, 58 per cent.

He left on the 31st with instructions to continue iron and arsenic and euquinine for one month.

This observation, deliberately planned and carried

out, is one more proof that, in individuals under certain unknown conditions, quinine produces hæmoglobinuria. The antecedents of the case seem to indicate that the conditions, which led to the formation (so to speak) of the hæmoglobinuric idiosyncrasy, were brought about by neglect of the use of quinine in the earlier stages of what may be a special form of malarial infection, and the consequent development of an intense and peculiar cachexia.

FILARIA LOA.

By A. T. Ozzard, M.R.C.S., L.S.A.
British Guiana Medical Service.

The following is a short description of two females and two males of *Filaria loa*, sent to Dr. Manson by Dr. S. M. Thompstone from the Congo, and presented to the London School of Tropical Medicine.

The specimens were mounted in glycerine jelly.

Females.—Length about 50 to 55 mm.

Head end.—This tapers rapidly towards the mouth, measuring at ·1 mm. from the extreme tip ·25 mm. in thickness, whilst at ·6 mm. from the tip it measures ·55 mm. in thickness, or the full width of the body.

There is no constriction or neck behind the head, which has no armature. The cuticle is slightly thicker over the tip of the head. There are no raised bosses over the head. No differentiation between œsophagus and intestine could be distinguished. Distance of genital pore from tip of head, about 2·35 mm. Running along the body of the worm are two uterine tubes terminating in coils at 1·2 mm. from the tip of the tail. Small rounded, transparent thickenings, or bosses, of the cuticle are seen over the greater part of the body of the worm.

Tail end.—The intestine terminates in a marked projection, the anal papilla, at ·3 mm. from the tip. The rounded cuticular thickenings or bosses cease at ·6 mm. from the tip of the tail, and the cuticle over the latter is thinner than elsewhere. On either side of and over the tip of the tail the cuticle presents a double contour, representing the lateral alæ, and the spaces between these lines are increased for a short distance on either side of, but not over, the tip itself. The tail is sharply curved. Its thickness at the anal papilla = ·275 mm.

Male.—Length, about 30 to 35 mm.

Head end.—The shape and cuticular arrangement of the head resemble those of the female.

The cuticular bosses over the body are less numerous than those in the female.

Tail end.—There appear to be two spicules, a short posterior and a long anterior one, continuous with the vas deferens; but they cannot be very clearly distinguished, and were none of them protruded in the specimens examined. There are three large pairs of pre-anal papillæ, and one large and one small sharp-pointed post-anal pair. The cuticle is thickened on the ventral aspect of the tip of the tail and over the tip itself.

The intestine terminates in an anal papilla at ·175 mm. from the tip of the tail, and the width of the worm at the anal papilla is equal to about ·175 mm.

The tail end is not so sharply curved as that of the females.

NOTES ON A CASE OF ULCERATING GRANULOMA OF THE PUDENDA.

By W. Renner, M.D.
Medical Officer, Freetown, Sierra Leone.

The patient was first seen and treated as far back as June 2nd, 1899.

I saw her to-day, March 23rd, 1903, four years after her treatment, and examined her. I found the parts healthy and in a satisfactory condition. The notes taken were as follows:—

Patient, M. W., aged 19, was admitted into the Colonial Hospital on June 2nd, 1899. Her friends stated that she had been suffering from "makru"* for

Ulcerating Granuloma of the Pudenda.

three years previously, and that she had undergone treatment from native herbalists, country fetish doctors, as well as from scientific medical men. No reliable account could be given respecting the disease excepting that they first noticed a small ulcerating, wart-like mass in the groove between the inner side of the right thigh and the inner side of the labia majora, which was spread-

* The term "makru" is of Fantee derivation, a language of the Gold Coast, and is specially applied to hæmorrhoids. In Sierra Leone the natives use it in their *patois*, commonly to indicate abrasions, ulcerations, hæmorrhoids, pruritis, and all disease in connection with the anus or vulva in both sexes. In the Yoruba language the term "orobo" is applied to diseases about the anus, while the term "orin" is applied to disease of the rectum and intestines. I am indebted to Professor Abayomi Cole for the explanation of these terms, as it would assist European medical officers coming out to this coast to distinguish and apply them properly.

ing over the neighbouring surfaces, and this had rendered walking difficult and painful. In the ward on examination, the inner surfaces of the thighs, vulva, vagina, perineum, anus, and the cleft of the buttocks were covered with ulceration, granular and cicatricial tissues. It exuded a dirty, brownish, watery, offensive discharge. The general health of the patient was not affected, and the inguinal glands were not enlarged (*vide* photograph illustrating her case). The disease attacks both sexes, and is never seen before puberty or in the persons of females *virgo intacta*. It is contagious and has no connection with syphilis. Antisyphilitic treatment does not affect its progress. I have not seen it before reported as occurring amongst the natives of the West Coast of Africa, although I believe it is not uncommon and has been mistaken for syphilis.

Dr. Daniels, who saw the photograph of this patient while he was here, considered it a typical case. I have since had the opportunity of seeing other cases in men as well as in women, and the treatment I have always adopted is excision of the growth freely, and scraping of cicatricial tissue with Volkmann's spoon, as in this case. Owing to the vascularity of the parts, healing is rapid and satisfactory.

TREATMENT OF BERI-BERI WITH ARSENIC AT THE DISTRICT HOSPITAL, KUALA LUMPUR, SELANGOR, F.M.S.

By A. J. McClosky, M.B., C.M.

The suggestion that beri-beri might possibly be a form of arsenical poisoning induced me to try this drug on my beri-beri patients, with a view to observing whether there would be any marked aggravation of the nerve symptoms and whether these patients would be readily influenced by this drug and exhibit some of the characteristic symptoms of poisoning other than neuritis.

Thirty-eight patients in all were treated with arsenic and the results were not satisfactory. The cases were not specially selected. The majority of them were of the chronic paralysed type of the disease.

The duration of illness before commencement of treatment in twenty-nine of the cases was from one month to fifteen months; in nine only was it of short duration—from four to twenty days.

The method of administration was as follows: A start was made with a dose of 3 minims of liq. arsenicalis, B.P., given thrice daily after a meal; this was increased by the addition of 1 minim to each dose, after every four or five days, until a maximum dose of 10 minims was reached (*i.e.*, 30 minims per diem). This dose was maintained unless untoward symptoms, such as diarrhœa, supervened, when the drug was stopped and resumed later on.

Diarrhœa supervened in 8 of the cases, 4 of whom died. Only 3 of these 8 cases, 1 of whom died, had consumed more than 6 grains of arsenious acid. It is probable that the diarrhœa in these cases was intercurrent and had no relation to the administration of the drug, inasmuch as some developed diarrhœa after very small quantities of the drug, whereas others consumed large quantities without any bad symptoms. It must, however, be remembered that individuals vary very much in their susceptibility to arsenic.

All the cases treated were Chinese and all were "miners" (alluvial tin) with the exception of three. All were primary attacks with the exception of one.

Of the 38 cases treated, 14 died, 20 were discharged, and 4 absconded.

The mortality was 36·84 per cent.; subtracting 2 deaths as due to intercurrent diarrhœa, gives 31·57 per cent.

Of the 20 patients discharged, 6 were cured, 8 relieved, and 6 not relieved.

Of those who absconded 2 were relieved and 2 not relieved.

Of the 9 most recent cases of illness, 2 died, 5 were relieved, 1 not relieved, and 1 cured.

The case that recovered (Case No. 27) gave a history of fifteen days' illness on admission; he was ninety-six days in hospital, and consumed in all 21 grains of arsenious acid.

The patients were considered recovered in so far as the numbness complained of had disappeared and common sensation restored, all œdema had disappeared, and the paretic limbs had regained their normal functions. The knee-jerk in all the cases was still absent.

The average stay in hospital of those who died was forty-seven days; the average stay in hospital of those discharged cured was sixty-five days; the average stay in hospital of those who were relieved was thirty-two days; the average stay in hospital of those not relieved was twelve days.

None of the cases exhibited such symptoms of arsenical poisoning as inflammation of conjunctivæ, suffusion of eyes, lachrymation, skin lesions, gastric symptoms, falling off of hair, and burning pains in the soles of the feet.

No pigmentation was observed, though this might have been overlooked in the dusky skin of the Chinaman.

The hospital diet consumed by these patients consisted of Rangoon rice, pork, salt fish, eggs, and vegetables, with fresh and tinned milk occasionally.

There was no relation observed between the quantity of arsenic consumed and its effect on the patient and on the disease. Most of the fatal cases had consumed comparatively small quantities of the drug; whereas some of the non-fatal cases consumed large quantities.

The drug does not appear to be a satisfactory medicine for the treatment of beri-beri, and recovery in the six cases may be attributed to rest, good feeding, good hygienic conditions, and removal of the patients from the place in which they sickened, rather than to any beneficial effects exerted by arsenic.

A series of other cases treated contemporaneously with chlorine mixture gave following figures.

No. treated.	Cured.	Relieved.	Not relieved.	Died.	Mortality.
45	20	17	2	6	13·33 %.

As in the case of those treated with arsenic the patients were not specially selected. They were all Chinese with the exception of two Malays, and all were "miners" with the exception of four. Thirty-seven were primary

attacks and 8 were relapses. The duration of illness in 23 of the cases was from one to eight months; in 22, from five to twenty-six days. Of the 22 most recent cases of illness, 3 died, 12 were cured, 6 relieved, and 1 not relieved.

Cases under other treatment, *e.g.*, mercury, are not compared, as they were not under special observation at the same time, and results of treatment vary so much under different atmospheric conditions.

The conclusion to be drawn from the observation of the thirty-eight cases treated with arsenic, is that arsenic has no curative influence on beri-beri, and that beri-beri is not a form of arsenical poisoning, as no gastric symptoms and no skin lesions were observed in any of the cases. Moreover, if arsenic were the cause of beri-beri it would be expected that there would be a marked aggravation of the symptoms, together with skin lesions, &c.

TABLE I.

Thirty-eight Cases arranged according to Total Dose of Arsenious Acid administered.

	Cured	Relieved	Not relieved	Died	Total
1 gr. and less ..	2	2	4 (1)	5	13
Over 1 gr.— 2 grs. ..	—	5	2 (1)	—	7
" 2 " — 6 " ..	—	—	1	6 (3)	7
" 6 " —10 " ..	—	2 (1)	1 (1)	--	3
" 10 " —20 " ..	1	1	—	1	3
" 20 " —30 " ..	3	—	—	1 (1)	4
" 30 " —37½ " ..	—	—	—	1	1
Total ..	6	10	8	14	38

Diarrhœa Cases in brackets ( ).

TABLE II.

Cases arranged according to Number of Days under Treatment by Liq. Arsenicalis.

	Cured	Relieved	Not relieved	Died	Total
Up to 9 days ..		—	2	1	3
10—19 "	2	3	3	4	12
20—29 "	—	4 (2)	2 (1)	1	7
30—39 "	—	—	—	2	2
40—59 "	—	1	—	3	4
60 and over	4	2	1 (1)	3	10
Total ..	6	10	8	11	38

Absconded in brackets ( ).

TABLE III.

Cases arranged according to Number of Days under Treatment by Chlorine mixture.

	Cured	Relieved	Not relieved	Died	Total
Up to 9 days ..	—	6	—	2	8
10—19 "	3	2	1	—	6
20—29 "	3	2	—	1	6
30—39 "	3	3	—	3	9
40—59 "	4	—	1	—	5
60 and over	7	4	—	—	11
Total ..	20	17	2	6	45

ILLUSTRATIVE CASES.

Case No. 28.—T. H., admitted on April 5th, 1902. Complained of numbness and weakness of hands and legs. Knee-jerk absent; has tenderness in the calf muscles of both legs; legs are not œdematous; there is marked paresis of the legs, and he is unable to walk. On April 12th, legs became totally paralysed; on April 21st commencing general œdema was observed; on April 24th diarrhœa supervened; he had been taking 7 minims liq. arsenicalis thrice daily since the 21st. Arsenic stopped on April 29th marked increase of œdema. On May 12th diarrhœa ceased, but arsenic was not resumed. This patient died on May 16th, and had consumed in all 2½ grains of arsenious acid.

Case No. 35.—T. S., admitted on February 19th, 1902. Complained of numbness and weakness of hands and legs; knee-jerk absent; tenderness in calf muscles, marked paresis of legs; unable to walk; no œdema of legs. On March 3rd œdema of legs observed; on March 14th œdema increasing, face puffy; there was total loss of power in the legs. This case got gradually worse, and on May 22nd diarrhœa supervened and continued till his death on May 29th. He was taking 5 minims of liq. arsenicalis thrice daily from April 26th to May 22nd, when it was stopped. This patient consumed in all 16 grains of arsenious acid. Cause of death—intercurrent diarrhœa.

Case No. 36.—S. M., admitted on February 19th, 1902. Complained of numbness and weakness of hands and legs. Knee-jerks absent; calves are not tender, gait ataxic; legs œdematous. On February 24th numbness has disappeared from the legs, but present still in the hands. On February 28th numbness of hands and œdema of legs were gradually disappearing. On April 21st numbness of hands and œdema of legs have entirely disappeared. Patient is now able to walk with a firm, steady gait. Improvement was maintained, and he was discharged on May 30th. This patient consumed in all 22¼ grains of arsenious acid.

Cases 28 and 35 illustrate two of the fatal cases in which diarrhœa supervened. It might be argued that the diarrhœa was brought on by the use of arsenic, but when case No. 28 is compared with case No. 36 this does not seem feasible. The former developed diarrhœa after consuming in all 2½ grains of arsenious acid, whereas the latter had consumed in all 22¼ grains of arsenious acid without developing diarrhœa.

Case 36 illustrates a case of recovery after 22¼ grains of arsenious acid had been consumed.

REFERENCES.

E. S. REYNOLDS, *British Medical Journal*, December 22nd, 1900.

RONALD ROSS and E. S. REYNOLDS, *Ibid.*, October 5th, 1901.

NEW TREATMENT OF BERI-BERI.—A report, issued by the authorities of an Asylum for the Insane in Java, states that the berry or pea of the *Phaseolus radiatus*, a common plant in Java, has proved effectual as a prophylactic and as a remedial agent in the treatment of beri-beri. It is a pea much used as a food by the natives.

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THE

Journal of Tropical Medicine

May 1, 1903.

BRITISH MEDICAL ASSOCIATION.

Seventy-first Annual Meeting, Swansea, July 28, 29, 30, *and* 31, 1903.

Section K.—Tropical Diseases.

President: George H. T. Nuttall, M.D., Ph.D.
Vice-President: Sir Francis Lovell, C.M.G.
Fleet-Surgeon P. W. Bassett-Smith, M.R.C.S.

Dear Sir,—At the forthcoming meeting of the British Medical Association at Swansea, it is hoped that the Section for Tropical Diseases will be as well attended as usual, and that all interested in this branch of medicine will unite to make the meeting a success, both by taking part in the discussions and by contributing papers.

The following subjects have been selected for discussion:—

Tuesday, July 28.—"The Disposal of Excreta in the Tropics." The discussion will be opened by Professor W. J. Simpson.

Wednesday, July 29.—"Trypanosomiasis." The discussion will be opened by Dr. Patrick Manson, C.M.G.

Thursday, July 30.—"Leprosy: its Etiology, Histology, and Treatment."

The Section will meet on each day at 10 o'clock, when the business will be at once entered upon.

The following gentlemen have already promised to take part in the discussions or to contribute papers: Dr. Manson, Professor W. J. Simpson, Mr. Cantlie, Fleet-Surgeon P. W. Bassett-Smith, Major Hendley, I.M.S., Dr. Dickson, Dr. Prada.

We shall be obliged if you will let us know at your earliest convenience if you will be able to take part in any of the above discussions, or if you propose to write a paper on any subject.

Papers bearing on the discussions or otherwise will be read for gentlemen who are unable to be in England for the meeting.

It is also hoped that pathological specimens, drawings, photographs, and microscopic preparations will be lent for exhibition.

We are, dear Sir,
Your obedient Servants,
George C. Low, *Hon. Sec.*,
London School of Tropical Medicine,
Albert Docks, London, E.
Leonard Rogers, Captain, I.M.S., *Hon. Sec.*,
Jenner Institute, London.

Extract from Regulations for the conduct of Annual Meetings of the British Medical Association.

(1) Papers at the Sectional Meetings must not occupy more than fifteen minutes in reading, and no subsequent speech must exceed ten minutes.

(2) Authors are requested to send short abstracts of their papers not later than Saturday, June 27th.

The subjects proposed for discussion by the Section of Tropical Diseases at the British Medical Association Meeting at Swansea, on July 28th to 31st, 1903, are of a nature to attract the sanitarian, the parasitologist and the expert in tropical diseases.

The disposal of excreta in the Tropics is an all-important subject, and as every conceivable variety of disposal is at present followed, there is a wide scope given for arriving at fairly accurate conclusions. That no single known method is suitable in all cases may at once be regarded as an established axiom from which to start in this enquiry. Towns at high elevations require a different method of disposal of their sewerage to those on flat plains near the sea-level. The question of elaborate and complicated systems of sewerage, for which intelligence on the part of the people using them is necessary for their working, are of questionable value. The separation of the storm water system of carriage from the sewerage,

the advantage and disadvantage of privies, cesspools, the bucket system, &c., must each and all come into the discussion, and it is to be hoped that there may be present at the meeting representatives from different parts of the Tropics and Sub-tropics, so that every variety of system may be duly set forth by those having practical knowledge of the methods in vogue.

Trypanosomiasis is an appropriate subject for discussion at the present time. Our knowledge of the disease has been gradually added to during the past twelve months, and it is well from time to time in this, as in other ailments, to review our information to date and indicate in what way further elucidation may be hoped for.

Leprosy is ever an attractive subject to practitioners in the Tropics, and Mr. Hutchinson's recent trips to South Africa and to India have stimulated afresh the consideration of a disease which from its very familiarity is apt to be neglected.

Under a president so able as Dr. George Nuttall, the meeting of the Section of Tropical Diseases at Swansea is sure to be successful and of record importance, and the fact that Dr. Patrick Manson, C.M.G., and Professor W. J. Simpson are to open two of the discussions guarantees that the subjects will be efficiently handled.

Correspondence.

The following letter appeared in the *Times* of *April 29th*, 1903.

THE MOSQUITO PLANT.

Sir,—A growing specimen of the mosquito plant (*Ocimum viride*), which I have just succeeded in bringing home alive from Northern Nigeria, has been accepted by the authorities at Kew, where it can now be seen.

I can personally testify to the extraordinary effect which is produced on mosquitos by the pleasant odour of its fresh leaves, and, by placing two or three growing pots of the plant in each room and along the windward verandah, a house can be kept practically free from these insects.

One of the malaria-giving specimens which I caught alive and tenderly enclosed within a leaf of the plant lost consciousness in a few seconds.

The scent of the bruised leaf partly resembles wild thyme and eucalyptus. The ordinary wild mint, the leaves of which are somewhat similar, should not be confounded with it. The natives where the plant is found prefer an infusion of its leaves to quinine in cases of malarial fever when they themselves or their children are attacked, and declare that, at any rate for them, the infusion invariably proves more efficacious than our antidote.

The schools of medicine which follow the modern mosquito-malaria theory might therefore give the matter some attention in the way of experiments on fever patients.

In India alone, where soldiers in barrack rooms are not supplied with mosquito nets, the use of the plant would prove an undoubted comfort, even if found wanting as a complete protection against malaria.

I am, &c.,
H. D. Larymore, Capt.R.A., Resident, Northern Nigeria.

Christ College, Cambridge.
April 26th.

Translation.

CLINICAL AND PATHOLOGICAL OBSERVATIONS ON BILHARZIAL DISEASE.

By Dr. Carl Goebel.

Translated from the German by P. Falcke.
Archiv für Schiffs und Tropen Hygiene, 1903, No. 3.

(*Continued from page* 128.)

Bilharzial affections of the kidney do not commend themselves for surgical interference from the fact that they are mostly symmetrical. Nevertheless, I was once obliged to incise and drain a symmetrical hydronephrosis. The patient came to hospital in a very weak and feeble condition, and with a distended abdomen. The quantity of urine passed in twenty-four hours was little more than a solution of bilharzia eggs. The patient complained of great pain. The right side was incised and several litres of thin urine emptied out. After two days' drainage of the cavity suprapubic cystotomy was performed in order to catheterise the ureters. The bladder, however, was quite contracted, and in the region of the opening of the left ureter a fluctuating left-sided hydronephrosis could be felt through the wall of the bladder. My first thought was to set up a new anastomosis between the bladder and the pelvis of the kidney. Still, as I feared the swamping of the region of operation, perhaps of the peritoneum also, with urine, I first of all made a lumbar incision on the left side and drained the pelvis of the kidney. Later, however, the patient was in too weak a condition for further operation, and he left the hospital almost dying. No eggs were found in the urine of the pelvis of the kidneys.

The operation chosen in bilharzial fistula is median section. The operation is by no means a simple incision, *but consists in extirpation of those portions of tissue around the tract, and of the callous fibromatous tumours already mentioned* which surround the fistulous openings. I did not content myself merely with simple division and scraping away the diseased tissues where there were slight changes, but where the fistulæ extended far into the surrounding skin I performed a thorough excision of the callous tumour-like portions of tissue, when possible in one piece. A wedge-shaped wound then resulted externally, the base of which covered a larger or smaller surface of skin, mostly with the (raphe ?) in the centre ; towards the interior (towards the urethra) it becomes more pointed. The wound is afterwards

plugged and a self-retaining catheter placed in the bladder for forty-eight hours. The wound heals by granulation. Frequently after-operations are necessary to incidentally dilate the above-mentioned strictures of the urethra. Excoriation of the bladder with the blunt spoon and subsequent rinsing is a process often combined with the operation to expedite the expulsion of the eggs. I have treated 27 bilharzial fistulæ in this manner. Of these 8 left the hospital quite cured, without fistulæ and at the most with a small superficial granulating wound in the perineum. The stay in the hospital averaged twenty-eight days (longest period fifty-three days, shortest sixteen days); 17 patients left the hospital after an average stay of twenty-five days (longest period forty-four days, shortest period thirteen days), with fistulæ still present, but relieved of the continuous trickling of urine, of the pains, of the inconvenience which the thickened tissues between the legs cause. Many patients, in spite of urgent advice to the contrary, left too early, but probably were cured afterwards. In most of them severe changes in the bladder or even the kidneys (purulent urine, &c.) stood in the way of a complete cure. The neglect these folks were guilty of, to have been the subject of fistulæ for so long a time that the surrounding tissue was so severely affected, is extraordinary.

Two cases died of pyelonephritis, 1 five days after, and 1 twenty-five days after the operation.

One of my cases, which left the hospital with a fistula, demonstrates that the alterations may after operation quite disappear, in spite of their severity. After a year and a half the man returned with a simple fistulous opening in the urethra, and without the surroundings showing infiltrations or other cicatricial alterations. The fistula closed without trouble after free freshening of the edges.

In only 1 case was the fistula complicated with stone.

Suprapubic section is, as a rule, *the only method of treatment for diseases of the bladder*. The median section is only occasionally required in children and adults who are suffering from pains in the perinæum. One operation that appears to me to be efficacious is the excoriation of the vesical mucous membrane in combination with high or median cystotomy. This operation has long since been indicated in severe cystitis, and it therefore seems the more necessary in a bilharzial bladder in order to expedite the expulsion of the eggs, which is otherwise very slow and leads to continued irritation of the organ.

I have treated simple bilharzial cystitis seven times by means of perineal section. I only possess exhaustive accounts of 4 cases, which show that the results were satisfactory in 3 cases, and disappointing in 1.

Of 9 cases of bilharzial cystitis which were treated by means of suprapubic section and scraping, one patient left the hospital whilst the wound still exuded a few drops of urine. (Open wound treatment with drainage of the bladder was always adopted.) All 9 cases were relatively much improved and discharged in a more or less satisfactory condition of strength.

Finally, on 3 vesical tumours induced by invasion of bilharzia I three times performed perineal section, but several of the cases were diagnosed as actual carcinoma or sarcoma. Once we removed a large tumour (carcinoma) by colpo-cystotomy. One small fistula remained, but the patient refused to have it operated on.

Suprapubic section was practised twenty-three times. Of these cases, 10 were discharged in good health without fistulæ, 10 with fistulæ, but either improved or at least relieved of the terrible pains that torture these patients; 3 died from consequent changes in the kidneys.

In 3 cases the vertex of the bladder was extirpated and these were cured without fistulæ. In another case, in which there was a carcinoma extending into the peritoneum, a fistula was left.

From the above one may imagine what ravages the bilharzial disease causes amongst the population of Egypt and how relatively impotent our treatment really is. But even in this disease we ought to achieve success if we etiologically could arrive at the root of the matter, that is, if the correct prophylaxis is discovered. The fact is recognised by almost all observers, and the axiom has been adopted that the unfiltered water of the Nile, or the puddles in the vicinity of the villages of the fellahs, may be regarded as the transmitters of the disease.

The fact that Europeans who only drink pure water, filtered or boiled, remain absolutely immune supports the correctness of this view. But on the one hand, several observations by Kartulis, Allen, Looss, seem to prove an infection through the skin. On the other hand, the medium, the intermediate host in which the supposed larvæ of the bilharzia worm exists, is still unknown.

Though we, doctors, are willing to leave the solution of this question to competent zoologists, we may question if the pathological, anatomical and clinical results of researches will be thereby influenced. Kartulis is of opinion that in a case described by him as an epithelioma of the leg the eggs were laid in that position by worms that had made their way from outside through the skin. He also states the possibility of fistulæ of the nates being caused by "direct infection through the skin." But I find that he simply ignores the intermediate stage between the embryo and the worm, and that is just the salient point.

I rather think that such conditions may be explained by the fact that the worms are capable of penetrating through the tissues and that they are not exclusively confined to the venous system.

Hitherto the clinical as well as the pathological anatomical facts are left in the dark in so far as the question deals with the manner, means and place of infection; in any case it speaks rather in favour of, than against, the drinking water theory.

A few observations seem to point to the possibility that though the intermediate host has hitherto not been found in water, it is probably contained in the soil.

Allen is of opinion that the larvæ of the bilharzia worms live in the slime of the river, which is stirred up by bathers, whose bodies become infected through the urethra by the worms.

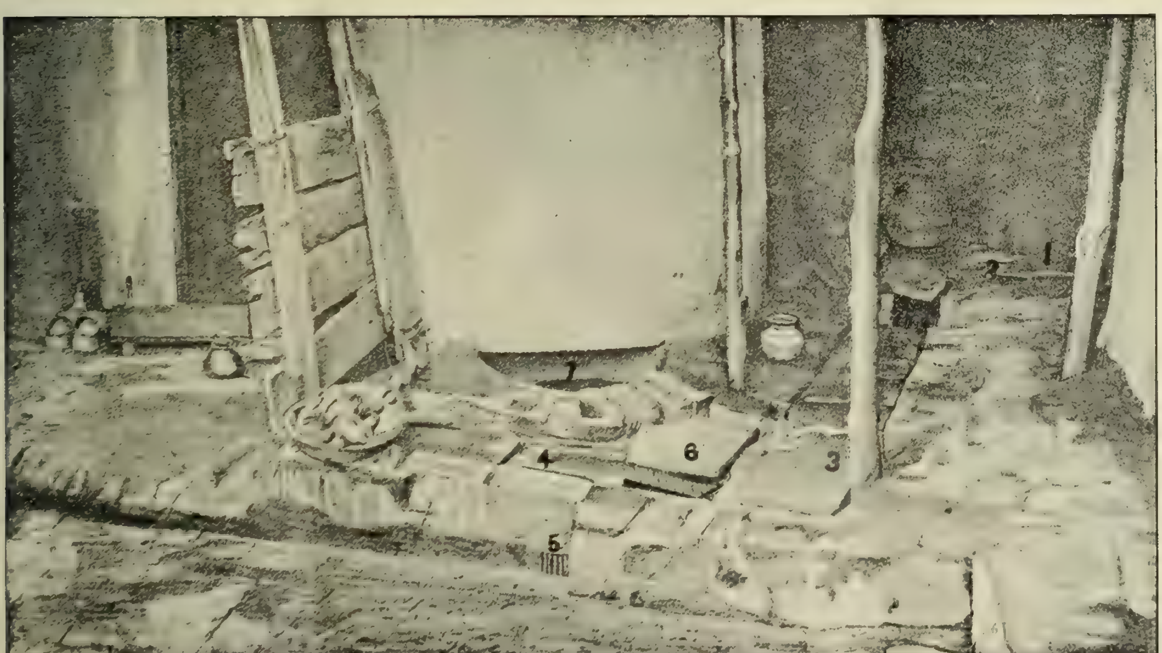
The theory that the soil is the medium of the supposed

ILLUSTRATIONS SHOWING CONDITION OF COMPOUND OF A HUT INHABITED BY TWENTY-SIX PERSONS AND IN WHICH THREE DIED OF CHOLERA.

Figs. I. & II. show the same Compound from two different points of view.

FIG. I.

FIG. II.



1. Entrance to Privy.
2. Drain, covered with tiles, leading from Privy.
3. Continuation of drain No. 2.
4. A second drain, covered with tiles, leading to gully-pit.
5. Surface grating, taking off water from compound into gullypit.
6. Gullypit, close to well and into which the several drains discharge, and which is connected with the underground drainage of the locality.
7. Well, surrounded by broken drains.

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larva or its intermediate host is supported by the fact that earth-workers are almost exclusively attacked by the disease in the country and gardeners in the towns.

Reviews.

TROPENKRANKHEITEN UND KOLONIALE MEDEZIN (Tropical Diseases and Colonial Medicine). By Dr. Eugene Joseph.

Dr. Joseph recommends young practitioners to make a voyage to West Africa as ship surgeons in order to obtain an insight into tropical diseases.

The most important disease encountered is *malaria ;* it is frequently acquired by persons on board ship and who have never been on land, the vessels passing through deep creeks close in shore.

Many persons hurry to embark on home-going vessels when they are much reduced by malaria ; the voyage seems to exert a beneficial influence on their health, more especially if they interrupt it to make a long stay at Madeira or Las Palmas.

Pure malaria is not so destructive as *blackwater fever*. The mortality from this cause is computed as quite 30 per cent. of those attacked. Death ensues in consequence of obstruction of the kidneys and subsequent uræmia ; some succumb to weakness of the heart, and a few even die in consequence of loss of blood.

Next to blackwater fever *dysentery* claims the most victims ; a sea voyage is also frequently of benefit to sufferers from this disease.

The negroes are an interesting study. *Umbilical hernia* is very frequently observed, and seems to cause no inconvenience. The negroes refuse to be operated on to remove the hernia, as they regard it rather as an embellishment to the person than a disfigurement.

The natives suffer much from extensive *ulcers of the leg ;* these are very weakening and show very little tendency to heal.

The so-called "*Cameroon swellings*" are of frequent occurrence. Although white persons are most liable to this affection, blacks are sometimes attacked. These swellings appear in the most diverse parts of the body, such as the back of the hand, the dorsum of the foot, the lip, the little finger, or the arm. There is no attendant pain and no rise of temperature ; the swellings disappear after three or four days. It has been demonstrated that it bears no relation to nervous disorders, but it is probable that its origin is in the subcutaneous tissues.—*Deutsche Med. Wochenschr.*, February 19th, 1903.

"CLIMATE" (APRIL NO.)

THE April issue of *Climate* is an especially good one. Dr. Sambon's article on Malaria is the chief feature of the journal, and well repays perusal in regard both to the excellent description of malaria and its parasitology, and for the admirable illustrations by Signor Terzi. Dr. Sambon's intention is to convey to the laity in simple language a knowledge of malaria in its many aspects. The instruction of the laity in this matter is absolutely essential if malaria is to be checked in its ravages, for no amount of regulations or bye-laws can ever hope to bring about this desirable end. The method of conveying this instruction cannot be better learned than by following the lines laid down by Dr. Sambon in this article. The illustrations by Terzi are clear and easily understood, and executed with that care and finish which at all times characterise the work of this excellent artist and delineator. We recommend both the text and the illustrations of this article as models to go by when the important duty of instructing the public in malaria is undertaken. An excellent article on the "Physical Qualifications for Tropical Residence or Travel" is contributed by Dr. C. F. Harford. This subject is one which comes frequently before the medical practitioner in Britain, and he will find many useful hints in Dr. Harford's article which will help him to arrive at a rational and a safe conclusion as to the qualities of physical fitness required in the case of British folk wishing to take up residence in the Tropics.

There are other contributions to the April number of *Climate* of special value to the traveller.

Notes and News.

IN view of the great importance, for the whole of the shipping interests, of the use of sulphur gas and of the Clayton Apparatus, the North German Lloyd Co. has obtained control of the Clayton Patents for Germany, and has transferred the sole rights to exploit this apparatus to the Norddeutsche Maschinen and Armaturen Fabrik in Bremen. In the interest of the health and safety of its passengers and crews, the Company intends fitting all its vessels with these machines, in case the expectations as to the results of the Clayton invention are confirmed.

THE Philadelphia Society of Tropical Medicine has been organised with the special object of preparing students of medicine and physicians for service in the tropical dependencies of the United States, and the following officers have been elected : *President*, Dr. Thos. H. Fenton ; *Vice-Presidents*, Drs. James C. Wilson and James Anders ; *Secretary*, Dr. Joseph McFarland ; *Treasurer*, Dr. E. B. Gleason ; *Executive Committee*, Dr. John V. Shoemaker, Chairman, and Drs. T. H. Fenton, Judson Deland, R. G. Curtin, Orville Horwitz, and Hobart A. Hare.—*Med. Rec.*, March 28th, 1903.

DR. Y. MIVA, a Japanese physician, says that the hæmostatic properties of gelatine were utilised by the Chinese more than 1,600 years ago to control nasal, urethral, uterine, and rectal hæmorrhages. The gelatine was prepared from the hides of cattle, and was

applied to the bleeding surfaces as a solution or powder. —*Clinical Review*, January, 1903.

THE Eleventh International Congress of Hygiene and Demiography will be held in Brussels in September 1903, under the patronage of the King of Belgium. The President will be pleased to receive essays or articles bearing on the subjects to be discussed and to exhibit anatomical preparations, bacteriological cultures and any other objects connected with hygiene and demiography.

Formulæ and Remedies.

CASTOR-OIL ADMINISTRATION. — (1) To mask the flavour of castor-oil and to increase its intestinal antiseptic action, Dr. N. V. Obrastzor, in the *Provence Medicale*, recommends the following mixture :—

℞. Castor-oil	℥i.
Menthol	grs. viiss.
Tinct. iodii	♏x.

A dessertspoonful for a dose.

(2) The following prescription is recommended in the *Brooklyn Med. Journ.*, January, 1903 :—

℞. Ol. ricini	℥i.
Glycerinæ	℥i.
Ol. gaultheriæ	♏x.

A teaspoonful to a tablespoonful according to age.

CLEANSING SOAP.—A special spirit soap is in use, it is said, in the clinic of Mikulicz, at Breslau. The field of operation is lathered and shaved, and the skin is scrubbed for five minutes with a piece of gauze dipped in the soap, the formula of which is as follows :—

℞. Ol. olivæ	parts 6·0.
Liq. kali caustic	„ 7·0.
Spt. vini rectif.	„ 30·0.
Aq. destil.	„ 17·0.

—*Clinical Review*, December, 1902.

SULPHATE OF MAGNESIA.—The very unpleasant taste of sulphate of magnesia may be fairly concealed by syrup of raspberry :—

℞. Magnesiæ sulphat.	℥iv.
Syr. rubi idœi	q.s. ℥ij.

To be given in required doses.

DR. SAMUEL E. EARP states that tannic acid in the proportion of 1 to 3 grains of quinine in a vehicle of syrup of tolu successfully disguises the taste of quinine.—*New York Medical Journal*, April 11th, 1903.

INTESTINAL WORMS.—(1) Thread-worms (*Oxyuris vermicularis*). The following may be used as injections :—

(*a*)	Sodii chloridi	2 drachms.
	Aquæ	1 pint.
(*b*)	Quassiæ (chips)	1 ounce.
	Aquæ	1 pint.
(*c*)	Aquæ calcis	q.s.
(*d*)	Naphthalin	10 grains.
	Olive oil	1 ounce.

(*d*) is suitable for young children.

Before using the specific injection, an enema of soap and water should be administered. Anal itching may be relieved by mercurial lotions or ointments, or by suppositories of iodoform.

(2) Round-worms (*Ascaris lumbricoides*). Treatment.

(*a*)	Santonin	3 grains.

Repeated morning and evening until 6 doses are given ; after third and sixth doses give a purgative dose of castor-oil.

(*b*)	Santonin	2 grains.
	Hydrarg. subchloridi	1 grain.
	Sacch. lactis	q.s.

To be given as one dose at bed time.

(*c*)	Santonin	2 grains.
	Olei ricini	2 drachms.
	Syr. aurantii	1½ drachms.
	Mucil : acaciæ	2 drachms.
	Aquam carui ad	3 ounces.

To be given in the early morning before food.

INFANTILE DIARRHŒA WITH GREEN STOOLS.—A teaspoonful of the following mixture to be given every two hours or more frequently, if necessary, up to every quarter of an hour, is recommended for this complaint.

℞. Lactic acid	1 to 2 parts.
Syrup of orange flowers	30 parts.
Distilled water	70 parts.

—*Revue Critique de Médecine et de Chirurgie*, 1902.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists, the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Bilharzia.

A CASE OF BILHARZIA HÆMATOBIUM.—At a meeting of the New York Pathological Society held on April 8th, 1903, Dr. Eugene Pool reported this case, which was of interest because (1) of its infrequency in this part of the world, and (2) of the phenomena shown under the microscope, *i.e.*, the development of the embryo and ovum. The patient was a young man, aged 20, a sailor. When 8 years old he went to the Suez Canal and remained there five years, and during that time he went swimming daily in the Suez Canal, in streams in the neighbourhood, and drank much of unfiltered water. The next five years he spent on a ship in the Mediterranean. He contracted an acute attack of gonorrhœa four days after exposure ; this was accompanied by very little increased frequency in urination and very little pain. He had the characteristic discharge, which disappeared at the end of fifteen days under urethral irrigations. Two weeks later, when in Algiers, it was very hot, and he noticed that his urine became diffusely red. He remained three months in Algiers. The condition persisted without other symptoms. He then went to Cuba, and the diffuse red urine changed to the characteristic hæmaturia of the disease, *i.e.*, after passing a normal amount of fairly normal-looking amber-coloured urine, and when the bladder was apparently empty, with an involuntary spasm of the bladder there would occur an expulsion of one or two

drachms of thin bloody fluid. This condition persisted up to the present time. He was nine months in Cuba and six months in the United States. He complained also of intense pain in the loins and a feeling of weakness which prevented him from work. Physical examination showed the man well nourished, and the abdominal organs appeared to be normal. The amount of urine voided in twenty-four hours was 1,950 cc.; reaction, acid; good colour; sediment, moderate in amount; specific gravity, 1019; albumin, a trace; urea, 41·3 in twenty-four hours. The sediment showed a small amount of blood and pus and a small amount of mucus. A few casts were present and some epithelial cells. Numerous ova of the *Bilharzia hæmatobium* were found. An examination of the blood showed red blood cells, 3,340,000; hæmoglobin, 86 per cent.; leucocytes, 6,600. A differential count showed lymphocytes, 47 per cent.; large mononuclears, 6½ per cent.; polymorphonuclear neutrophiles, 36 per cent.; eosinophiles, 9½ per cent. Photographs were shown of the ovum in various stages of development.—*Med. Record*, April 18th, 1903.

Dysentery.

Priority of Discovery.—Professors von A. Chantemesse and F. Widal dispute the claim set up by Professor Kruse and Dr. Shiga in regard to the priority of the discovery of the bacillus of dysentery. Chantemesse and F. Widal state that on April 17th, 1888, they announced the bacillus in the Académie de Médécine, Paris, and their observations were published in the *Semaine Medicale*, April 18th, 1888, and in other French medical journals. They claim that the description they give is identical with the Kruse-Shiga bacillus. We referred to Kruse's observations in our issue of April 1st, 1903. The complete literature in regard to the question of the priority of the discovery of the bacillus of dysentery will be found in the *Deutsche Medicinische Wochenschrift*, Nos. 1, 3, 7 and 12, 1903. The facts seem to be that Chantemesse and F. Widal described a bacillus specific of dysentery in 1888 in France. Shiga published his researches on the bacillus of dysentery in Japan in 1898. Kruse described the bacillus of endemic dysentery in Germany in 1900. Whether any of these bacilli are the specific cause of dysentery, or whether these observers are actually dealing with the same bacillus or different bacilli, remains to be proved.

Leprosy.

The Care of Lepers in India.—At the annual meeting of the Mission to Lepers held in Exeter Hall, London, on April 22nd, 1903, Mr. W. C. Bailey said that there is great need for a central home for European lepers in some healthy situation in India. Sir A. Wingate observed that: "In the treatment of leprosy isolation was absolutely necessary, but the segregation must be as far as possible voluntary. In this country, where people had been educated to understand the requirements of medical science, it was possible to adopt a compulsory method; but in the East compulsion was almost sure to lead to concealment, and therefore became dangerous."

An Analysis of 220 Cases of Soudanese Leprosy, by J. T. Tonkin, L.R.C.P. *The Lancet*, April 18th, 1903.

Varieties of Leprosy.—Mr. Tonkin states that 86·7 per cent. of cases presented patches of leprosy only, against 11·3 with tubercles, showing that the macular variety predominates in the Soudan.

Sex.—Males amounted to 56·81 of the cases; females to 43·19.

Age.—The majority became lepers between the ages of 6 and 25 years.

Duration.—Should the leper have survived a twenty-year course of the disease he will also have survived the disease itself. A post-leprous state is recognised in which good health obtains.

Parents affected.—Of the lepers, 89·09 per cent. were children of non-leprous parents; of the remainder both parents were leprous, or one parent only was affected either before or after the subject's birth.

Fertility.—Of 131 couples under notice the average number of children per couple amounted to 1·19 (nearly).

Leprosy in Family.—Patients examined who gave a history of leprosy in the family (out of 219 examined), 52; cases without leprosy in the family, 167.

Diet.—The natives of the Soudan are chiefly vegetarian in their habits; yet meat is consumed at times. Fish is not a common article of diet, and salt is scarce and dear. Inefficient diet is considered by Mr. Tonkin as an etiological factor.

Liver.

The Present Position of Gall-stone Surgery, by Dr. William W. Seymour. *Journ. Amer. Med. Assoc.*, April 18th, 1903.

Acute Yellow Atrophy of Liver, by Dr. W. W. Grant. *Journ. Amer. Med. Assoc.*, April 18th, 1903.

Malaria.

Ein Malariarezidiv nach ungewöhnlich langer Latenzperiode [A Malarial Relapse after an Unusually Long Period of Latency], by Dr. Claus Schilling. *Deut. Med. Wochenschr.*, March 5th, 1903.—The patient had been to East Africa three times, had suffered from a series of attacks of fever, and had had two attacks of blackwater fever (after quinine). Most of the attacks of fever were of the tertian type and relapses followed each other at short intervals. The patient had a relapse after his first stay in East Africa during his furlough home. The last typical attack of tertian occurred in Dar-es-Salaam in July, 1900. He went on furlough from August to December, 1900, and his last stay in Dar-es-Salaam was from January, 1901, to April, 1902, during which time he did not have one attack of fever, his temperature never having risen above 37·8° C. The patient has been in Berlin since May 24th, 1902. On January 12th, 1903, he had a severe rigor, temperature 39° C. On the 13th inst., temperature normal. On the evening of January 14th, temperature again rose to 41°, when attacks of precordial agony supervened; pulse weak and slow; cardiac sounds pure; spleen perceptible; a few small tertian annular forms observed in blood preparations. On January 15th, medium-sized rings were observed in the blood cor-

puscles; temperature below 37°. On January 16th, adult tertian parasites. Quinine given at 10 a.m. At 7.30 p.m. (nine and a half hours after the dose of quinine) renewed attack and temperature of 40·3°. Digitalis caused an improvement of subjective disorders. Many segmentation forms of the tertian parasites, also large parasites with irregular contours. January 17th, temperature normal. On January 18th quinine given every hour. The temperature did not rise on this day.

As the patient had had no opportunity of becoming infected with malaria in North Germany, this could only be ascribed to a relapse of tertian fever acquired in the Tropics. He had left East Africa eight and a half months previously, but the last attack of fever in Africa occurred two and a half years ago.

Zur Erleichterung der Mikroskopischen Malaria-diagnose [An Easy Method for the Microscopical Diagnosis of Malaria], by Dr. Reinhold Ruge. *Deut. Med. Wochen.*, March 19th, 1903.—Dr. Ruge in an article with the above title discusses Major Ronald Ross's method of staining malarial parasites. The method referred to by Dr. Ruge is given in the *Journal of State Medicine*, December, 1902, in the *Lancet*, January 10th, 1903, and referred to in the Journal of Tropical Medicine, January 15th, 1903. Ross's mode of staining is as follows: —

"The finger is pricked by a lancet-shaped needle or by the point of a lancet. A large drop of blood, amounting to, say, 20 cubic millimetres, is taken up on the glass slide or cover-glass and is *slightly* spread out by means of needle or lancet—that it, it is spread over an area which can be covered by an ordinary cover-glass. It is then allowed to dry, either naturally or over a flame (without heating so much as to fix the hæmoglobin). The result is that we have a thick dried film of blood in which about 20 cubic millimetres of blood (instead of the one cubic millimetre generally used) are disposed over an area which is not larger than the area of blood usually examined by the ordinary processes. As soon as the film is perfectly dry I lay upon it by means of a glass rod a quantity of aqueous eosin solution sufficient to cover the film of blood. The solution is the one which is usually employed in order to obtain the Romanowsky effect. It is allowed to remain upon the film of blood for a period up to about a quarter of an hour. This period should be inversely proportionate to the strength of the solution. As the film of blood has not been fixed the solution of eosin will take out the hæmoglobin of the dried corpuscles and, at the same time, will stain the residual mass consisting of the stromata of the corpuscles, the leucocytes, blood plates, and parasites. After the solution has remained upon the film for the period required it is washed off by a very gentle stream of water. As the film has not yet been fixed to the glass it is most essential here to use no strong current of water, or else the whole of the residual mass will become detached from the surface of the glass. As soon as the eosin solution has been washed out a weak solution of the methylene blue which is employed for the Romanowsky stain is allowed to run over the film, just as was done for the eosin solution. The blue is permitted to remain only for a few seconds, the time varying inversely with the strength of the solution. Especial care must be taken not to stain the preparation too dark a colour. Next the blue is washed off very gently in its turn and the preparation is complete. We can now dry the stained film and mount in Canada balsam, or examine it directly by placing a drop of cedar oil upon it for the immersion lens; or we can mount it in water, place a cover-glass over it, and examine as usual."

Dr. Ruge approves of Major Ross's plan of staining, and makes the following suggestions: "In the meantime if I do not fix the preparation at all, as Ross advises, I find on rinsing, that part or even the whole of the layer of blood is washed off. I have, therefore, after preparing the specimens according to Ross's plan, treated them according to the well-known method of combining the fixing and the extraction of the hæmoglobin. As, however, the layer of blood in the preparations in question is very thick, placing them in a 1 per cent. solution of formalin does not suffice, for before all the hæmoglobin is extracted the preparation is already fixed. I therefore add ½ to 1 per cent. acetic acid to the watery solution of formalin, and increase the formalin to 2 per cent.* By this means I attained the result I desired. If a cover-glass with a thick layer of blood is inverted in a vessel filled with this fluid the hæmoglobin is extracted in a few minutes, and the layer fixed to that extent that the preparations can stand being well rinsed in water, and subsequently stained with diluted Manson's solution, or even according to Romanowsky's method. If in a hurry, one may even warm such preparations a little in Romanowsky's solution to expedite the process, and then differentiate them in acidulated water without dissolving the layer. The sediments are easily washed out with alcohol. As the colour of the plasma of the parasite is somewhat lessened by laying it in formalin, it will be necessary when dealing with small or medium-sized tropical rings to again stain the specimens prepared according to Romanowsky with diluted Manson's solution, having previously washed off the sediment; the minute plasma rings will then be distinct.

These preparations will not be elegant, for a sediment will deposit more or less in various places. The parasites will, however, be easily found when very numerous, and in any case with the assistance of Ross's method, much time and trouble will be saved."

Le Manifestazioni Cutanee nel Corso della Malaria [The Cutaneous Manifestations in Malaria], by Dr. Antonio Vaccari, Florence. *La Clinica Moderna*, 1902, No. 52.—The cutaneous manifestations in the course of malarial infections have been noticed by various authors from time to time. Corre in his book on "Malades des Pays chauds," Paris, 1887, describes malarial urticaria; they are also referred in the treatise of Marchiafava and Bignami; and in an article by Dr. Massucci which appeared in the *Annali di Med.*, November, 1902, No. 9. Whilst in Maddalena Island,

* In this connection commercial formalin is taken as being about 40 per cent.

Sardinia, Vaccari in 1895 observed three cases of malarial fever accompanied by cutaneous eruptions which disappeared under quinine. At Spezia, in 1901, the same observer met with yet another case similar to the above. The character of the eruption in the skin resembled most closely an erythema. There was no pruritus, and therefore Vaccari does not think the term "Malarial Urticaria," under which name the condition is usually referred to, an appropriate one. Vaccari considers that such eruptions are well explained by Dr. Larredde, who regards them as a condition of the blood due to toxic influences.

Treatment of Ague by the Hypodermic Injection of Quinine, by Lieut.-Col. John Smyth, M.D., I.M.S. *Indian Medical Record*, March 25th, 1903.—Col. Smyth states that it is twenty-five years or more since Col. T. McGunn began the treatment of ague by the hypodermic use of quinine, so that it is a mistake to regard the treatment as a new procedure.

In India, according to Col. Smyth, the subcutaneous injection of quinine is practised in preference to the intramuscular method. He advocates the use of the bisulphate of quinine, in the proportion of 1 grain of the drug to four minims warm water, in which it is dissolved readily. Five grains is the usual dose for an adult. The procedure consists of first cleansing the skin by bichloride of mercury or carbolic solution, washing out the syringe repeatedly with hot water, and smearing the needle with carbolic oil. The quinine solution should be warmed before use. As a rule the injection is painless, but to avoid a lump remaining the swelling created by the injection should be gently stroked. Col. Smyth does not regard the hypodermic injection given in a desultory fashion as possessing any greatly specific or actively remedial action, and finds that doses of the drug have to be persisted in when given by the mouth so that they have to be injected daily, or even several times daily to ensure success in treatment.

Inoculation against Malaria, by Philalethes Kuhn. Translated by H. A. Nesbitt. H. K. Lewis, London, 1902.—Dr. Kuhn, from the analogy he has observed between horse-sickness in German South-West Africa and malaria, advocates the employment of a serum obtained from horses suffering from horse-sickness. The results of this treatment are yet neither complete nor convincing, and we await the publication of Dr. Kuhn's further experiments.

Plague—Prevalence of the Disease.

India.—During the weeks ending March 28th, the deaths from plague numbered 32,078. This is the highest weekly mortality from plague in India since the disease appeared in 1896.

Cape Colony.—During the week ending March 28th and April 4th, the following is the plague report: Port Elizabeth, cases 7 and 2, deaths 3 and 2 respectively; East London, cases 1 and 2, deaths 2 and 1; at King William's Town no fresh cases or deaths, 3 cases remain under treatment.

Mauritius.—Plague reappeared during the week ending April 23rd, when 2 cases and 1 death occurred. No case of plague had been reported in Mauritius since March 19th.

Hong Kong.—During the weeks ending April 18th and 25th, the fresh cases numbered 51 and 79, and the deaths from the plague 47 and 72.

Suez.—The ss. "Orizaba" from Sydney to Britain landed a man suffering from plague at Suez. At Plymouth the British authorities declared the ship infected.

Bubonic Plague.—In view of the reappearance of the bubonic plague both in Brisbane and Freemantle, the health authorities are making a careful examination of rats caught in different portions of the city, with the view of ascertaining whether or not they are infected with the plague bacilli. So far the rats have been found to be in a healthy condition, and as a large number of them has been examined, the result bears out the statement made a fortnight ago by Dr. Ashburton Thompson, that so far as infection from rats is concerned Sydney is, at the present moment, in as healthy a condition as any place in the Australian States.—*The Austr. Med. Gaz.*, March 20th, 1903.

Yellow Fever.

Transmission of Mosquitoes by Ships.—According to the Bulletin of the Yellow Fever Institute, from investigations which have been made regarding the transmission of mosquitoes by vessels, the general conclusions are drawn: first, that mosquitoes may come aboard vessels under favourable conditions when the vessel is not over fifteen miles from shore; second, that Stegomyia may be carried from Mexican or West Indies ports to Mexican Gulf States, U.S.; third, that they may board a vessel lying at anchor a half mile or less from shore, being conveyed by the open lighters; and, finally, that a vessel moored a short distance from land may become infected with yellow fever.—*Boston Medical and Surgical Journal*, April 16th, 1903.

SNAKE-BITE: RECOVERY.

By Atul Chandra Mukherji, C.M.S.

On March 12th, 1902, I was called in to attend a snake-bite case at Gadighat. It was stated by the patient that while he was coming home from the field at night, he felt a sudden darting pain in the left great toe. The pain gradually increased in severity and extended over the leg. He cried out, and his companions thinking that he had been bitten by a snake at once came for me.

Condition.—Fairly nourished and strong built. He was almost drowsy and comatose. Body perspired. Temperature 98° F. H. Pulse weak and slow. Had dyspnœa. Had two punctures about half an inch apart, and the bleeding was slight.

Treatment:—

(1) A ligature was tied on the lower part of the left leg.
(2) Condy's fluid wash.
(3) A deep incision was made from the punctures to the plantar surface of the toe.
(4) A cautery iron was pressed against the incision.
(5) Bleeding was encouraged by hot water.
(6) Pot. permanganas lotion D.P.
(7) ℞. Liq. strychninæ hydras .. .. .. ♏xxx.
Vini gallici .. .. ʒiv.
Aqua .. .. ad. ℥iv.
M. ft. Put four marks; every four hours.

March 13, 1902. — Patient sensible. Temperature 98·4°. Pulse regular. No dyspnœa. The leg was much inflamed; suffered much pain.

Treatment:—

(1) Ligature loosened.
(2) Iodoform dust and carbolic oil D.P.
(3) ℞. Quini bisulph .. .. grs. v.
Acid nitro-muriatic dil. .. .. .. ʒss.
Liq. strychnia hydro. .. .. .. ♏x.
Vini gallici .. .. ʒvi.
Aqua.. .. .. ad ℥vi.

M. ft. Put six marks; every four hours.

March 14, 1902.—The lympatic glands of the neck were inflamed. Had a fair appetite. Bowels regular.

Treatment:—

(1) Continue all.
(2) Tinct. iodine paint over the inflamed part.

March 15, 1902.—Was much the same. The eyelids of the right side became œdematous.

Treatment:—

(1) Continue all.
(2) Tinct. steel paint over the eyelids.

March 20, 1902.—The wound looked better. The other symptoms were much the same. Had pain in deglutition. Both the tonsils were inflamed.

Treatment:—

(1) Continue all.
(2) Argenti nitras lotion (gr. 40 to ℥i.) touch to the tonsils.
(3) ℞. Acid hydrochloric dil. .. .. .. ʒss.
Pot. chloras .. .. ʒss.
Vini gallici .. .. ʒvi.
Dec. cinchonæ .. .. .. ad ℥vi.

M. ft. Put six marks; every four hours.

March 23, 1902.—Was much better. The inflammation of the glands much subsided. Slight pain in deglutition.

Treatment.—Continue all.

March 26, 1902.—Quite recovered, except for some weakness. I advised—

Ferri et quini citras .. .. .. ʒss
Acid nitro-muriatic dil. .. .. .. ʒss.
Amon. chloride .. .. ʒss.
Tinct. nux-vomica .. .. .. ♏x.
Inf. quassia.. .. .. .. ad ℥vi.

M· ft. Put six marks, t. d.

—*Indian Medical Record*, April 1*st*, 1903.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
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The Journal of Tropical Medicine.

CONTENTS.—MAY 15TH, 1903.

Original Communications.

NOTES ON THE INSANITARY CONDITION OF STANDERTON, TRANSVAAL.

By MYER COPLANS, M.B.Lond.

STANDERTON in the Transvaal is situated on the High Veldt, at an elevation of 5,000 ft. The centre of an extensive cattle-raising district—treeless in character—100 miles S.E. of Johannesburg, the town may be described as a collection of tin huts and small brick-built houses "dumped down" and sporadically scattered around a few broad nameless roadways.

In 1897 the Natal Railway extended through the town towards Pretoria. The Vaal River winds from east to west just south of the town, and is everywhere fed by numerous short deep watercourses. A mile away, and to the west along the Vaal River, is a collection of mud huts—the Kaffir location. About the Railway Station is a small compound of well-built brick houses for the railway employées.

Thus before the war there were three separate communities, and the total population at no time exceeded 1,500. The prairie rolls away on all sides, and the far distant horizon is backed by broken mountain ranges. Waggon tracks stretch away to Pretoria, to Natal, to Orange River Colony and to Swaziland.

The military occupation of Standerton in 1900 brought a military garrison, a military hospital and a new cemetery. Then the policy of the war demanded the bringing in from off the outlying farms—of the non-combatant inhabitants—white and coloured. The whites, 4,000 in number, were concentrated in a large enclosed camp on the opposite bank of the river, away from the town.

With the development of block-house lines, stretching north, south and east, and a 3-mile ring of block-houses round the town, Standerton became the *pied-a-terre* of the many mobile columns, a central point for the supply of commissariat transport and a receiving point for worn beasts of burden, and for sick and wasted manhood.

It is calculated that at various times 100,000 men—polluting the soil everywhere—had encamped within the block-house circle of the town. A record of 15,000 admissions to the military hospital, of 500 graves in the recently laid down military cemetery, speaks of the ravages caused by two years of war in this district alone on our troops.

With no less gentle hand was the animal world spared. Hundreds of sick horses died or were slaughtered daily, and thousands of carcases filling the air with fœtid odour were abandoned on the west of the town to the expectant vultures.

All around, for many miles, scarcely a dip in the ground, a flat, a gentle slope, a pool, or a watercourse was to be found without the inevitable dead horse, or cow, or ox, or sheep, or goat. Chicken sickness, cow sickness, horse sickness, mule sickness, man sickness, everywhere.

Such was the condition of a town and its neighbourhood after a two years' war. To the student of public health an added interest may be found in a short account of the sanitary arrangements of the place, in so far as the propagation and prevention of disease is concerned.

Firstly before the war: Sewage is collected in buckets, mixed with or without dry earth, and is carted away by night to the west of the town and buried in pits close by the river. There is no system of drainage of any sort. Water is pumped from a pumping station a mile to the east of the town, direct from the Vaal River to a reservoir on a slight eminence close by. One day's supply is held in reserve. Water is distributed thence to various standpipes in the town, from which the public draws its water as required. Some of the houses during the rainy months catch some of the roof water and store it in galvanised zinc tanks for cooking purposes. There are several wells, 100-200 ft. deep, and the water is most probably surface water. There is no attempt at

filtration of any sort. The old cemetery is placed on an eminence below the town pumping station, but it is probably drained into the river about the point of the town's water supply. The houses are usually one storey. The Railway Compound has its water supply from the Vaal River direct from a pump near the railway bridge. The water is distributed from a small reservoir to standpipes in and about the station. There is no attempt at filtration. Between the town pumping and railway pumping stations is a stretch of water used for bathing purposes, then a stretch used for washing clothes, then one used for watering mules and horses, and lastly, and nearest the railway bridge, the old road winds through the river, and is still much used. All these are sources of contamination to the water as used at the railway station. In the dry season the river may be crossed on foot, in the rainy season the water in the shallowest spot may be 5 feet deep and a torrent.

Since the war commenced: The corps of Royal Engineers extended the Town Standpipe system to the New Military Hospital, the military camps, and erected more standpipes in the town. There is no attempt at filtration. The engine power was not increased, and machinery breakdowns have occurred—the inhabitants relying for their water supply on the river. Each military unit made its own arrangements for precipitating, clearing, boiling and filtering its own drinking water. A pumping station for the Burgher Concentration Camp was erected just by the town pumping station, on the opposite side of the river. The water was carried to a reservoir in the camp and distributed direct to standpipes in the camp. New sources of contamination arose, both of the town and the station supply.

Just by the Town and Burgher Camp Pumping Station is a gentle declivity down to the river. This became used as a camping ground and watering place for convoys proceeding east, and in time became one continuous surface of animal offal. Close by the Railway Pumping Station, near the railway bridge, was the place of outfall of the Burgher Camp Sewage on the one bank, and on the other bank there opened a stream which drained the new military cemetery.

The town and military sewage system of dry earth in buckets and burial in earth pits prevailed as before. There is still no system of drainage. The water from the Railway Pumping Station is distributed to two taps on the station platform. One marked indistinctly "not for drinking," and the other "for drinking." The water at the tap "for drinking" was limited, and some attempt had been made at clearing and filtration. It was impossible to distinguish the taps in the dark or in a dust storm, and only with difficulty could they be distinguished by day. The various troops passing up and down the line and other passengers, too, used these taps indiscriminately.

Garrison soldiers were not allowed on the station platform, and on various occasions "cold drink" shops in the town were out of bounds.

The amount of sickness and death among our own troops has already been stated. Zymotic diseases accounted for a large percentage. The Railway Compound had its own tale. Year by year they were decimated by enteric fever.

This then is the condition of the water supply: That for the troops and inhabitants of the Town and Burgher Camp is contaminated by the drainage of the old cemetery, and a new outspan or camping ground for man and beast. That for the railway station, used for thousands of troops and passengers passing to all parts of South Africa, is a water supply contaminated by a sewage outfall, by a stream draining a new cemetery, by a watering place for horses and mules, by an old drift, by a bathing reach, and by the contamination of the town water supply. In addition, along the banks of the river, 100,000 men had polluted the soil.

Everyone knows of the climatic conditions of this part of the country. The rainy season—the hot one—lasts for three months, from November to January. It is characterised by torrential downpours, commencing suddenly, terminating abruptly. The surface of the soil becomes a stream of rushing water—all to the Vaal River—and in a few hours this has risen several feet.

In a few hours the river falls, the earth becomes dry and friable. Later on a dust storm, thick as a London fog, a high wind heavily laden with dust, blows for hours unceasingly. There is dust in one's eyes, in one's throat, in the ears, between the outer and inner watch-case, in the razor case—everywhere. There is nine months' dry, little rain falls and dust storms are not so severe. The evenings are always cool, and a breeze some time during the twenty-four hours may be reckoned upon.

The exigencies of war demand from man and beast at any moment and for indefinite periods the maximum of physical endurance; from mankind, in addition, an increasing mental activity.

On the veldt the food supply was always wholesome, the water always doubtful. The yearly veldt fires destroyed the carcases of animals lying in the open on the flat, but the watercourses were never touched.

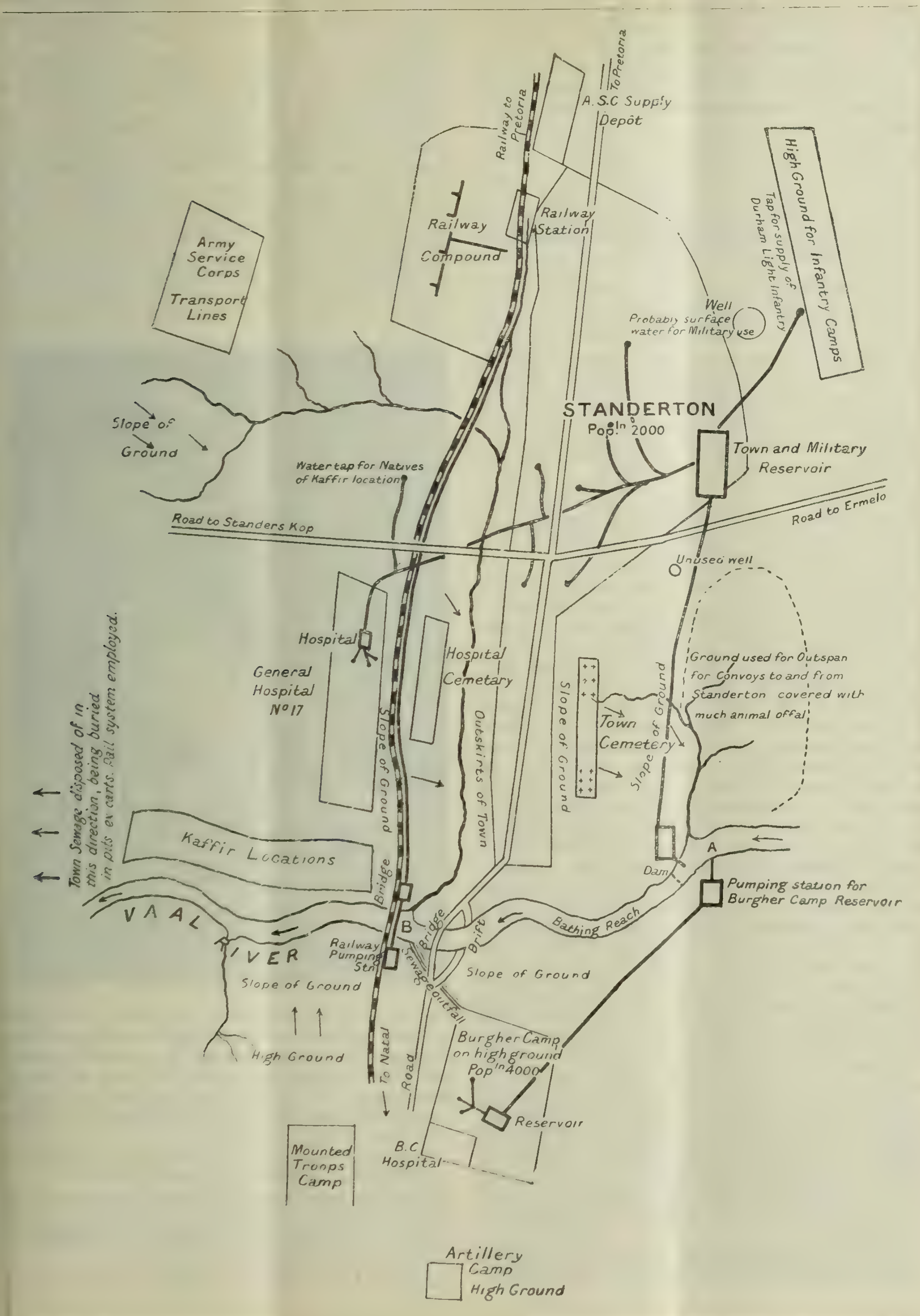
In the town, a place where, owing to the violent dense penetrating dust storms, the church-steeple cannot be considered free of infection from the soil beneath; where the ground is polluted by the inhabitants on all sides; where thousands of dead bodies of horses are allowed to accumulate; water contaminated by sewage and by the drainage of cemeteries, by camping grounds, is delivered unfiltered and untreated for human consumption, and the railway station is allowed to become a distributing point for the germs of disease throughout the length and breadth of South Africa.

Eight months after the war 10 per cent. of cases in hospital are enteric, and dysentery fills many beds. Yet there were four medical authorities in this village of 1,500, with its burgher camp of 4,000 and its garrison which never exceeded 8,000. Each authority was independent of, and never consulted with, another—and this in a town under martial law. The authorities were those of the railway, of the town, of the burgher camp and the military authorities.

The carelessness and gross criminal negligence of it all!

Standerton is within twenty days' journey of England. In these days of rapid transit, of the annihilation of space, and when space yields to a time factor, enteric fever contracted in South Africa may easily develop after arrival in England.

There is one lesson to be learned from all this—the


To Pretoria
Railway to Pretoria
A.S.C Supply Depôt
High Ground for Infantry Camps
Tap for supply of Durham Light Infantry
Railway Station
Railway Compound
Army Service Corps Transport Lines
Well
Probably surface water for Military use
STANDERTON
Pop.ln 2000
Town and Military Reservoir
Slope of Ground
Water tap for Natives of Kaffir location
Road to Standers Kop
Road to Ermelo
Unused well
Hospital
General Hospital No 17
Hospital Cemetary
Ground used for Outspan for Convoys to and from Standerton covered with much animal offal
Slope of Ground
Outskirts of Town
Town Cemetery
Slope of Ground
Slope of Ground
Town Sewage disposed of in this direction, being buried in pits ex carts. Pail system employed.
Kaffir Locations
Bridge
Dam
A
Pumping station for Burgher Camp Reservoir
VAAL RIVER
B
Railway Pumping Stn
Bridge
Drift
Bathing Reach
Sewage outfall
Slope of Ground
Slope of Ground
High Ground
To Natal
Road
Burgher Camp on high ground Popln 4000
Reservoir
B.C Hospital
Mounted Troops Camp
Artillery Camp
High Ground

paramount necessity of a central sanitary authority for all areas where humanity does congregate; the need of the institution of a system of medical public health inspectors for all portions of a civilised country—both during peace and war—acting under a supreme sanitary authority.

CASE OF PERIPHERAL NEURITIS, PROBABLY RICE PRODUCED, SIMULATING BERI-BERI, FROM OMDURMAN, SOUDAN.

By J. B. Christopherson, M.A., M.D.Cantab., F.R.C.S.Eng.
Surgeon attached to Egyptian Army; late Surgeon Seamen's Hospital, Albert Dock.

An Egyptian tailor of the 8th Battalion, aged 50, was admitted into the Omdurman Military Hospital on November 22nd, 1902, unable to walk or use his legs. The night previous he had gone to bed quite well, but was unable to get up in the morning.

A friend told him that he had some "fever," but no record was made of this. His paralysis increased whilst he was in hospital, so that although he was able to sit up and be brought to the hospital on a donkey, on December 25th, when I first saw him, he could not raise himself in bed from his back.

On admission he had, he says, some pains in the legs.

On December 25th he lay on his back and seemed paralysed from the middle downwards, excepting that he could slightly abduct his thighs.

There was considerable wasting of the gluteal, thigh and calf muscles, and there was œdema of the feet, shins and loins, but none of the scrotum or eyelids. There were also some pressure sores over the sacrum. Arms and face were natural. Eyes and special senses natural. Digestive system and tongue natural. He sometimes passed fæces under him, but sphincter ani was natural. He sometimes passed urine under him, but he could hold his water, and for both of these occasional acts he gave as an excuse that he "never felt them." *Urine* was normal in reaction and contained no albumen; it was also normal in quantity; this obtained throughout the illness. Lungs natural in every respect and heart also; no abnormal sounds and no increase in dulness. The abdomen was flabby but natural. The knee-jerks and superficial reflexes of the legs were entirely absent. Common sensation *seemed* impaired, but not absent; there were no areas of anæsthesia. Sensation was, however, not easy to investigate. Gastrocnemii tendons not indurated, calves not tender. It will be seen that the motor nerves were chiefly affected, all the muscles of the lower extremities excepting (partially) the abductors of the thigh; the trophic nerves were possibly also affected, as indicated by pressure sores over the sacrum and a tendency to soreness over the hips, with œdema. Sensory nerves were only slightly involved, and the vaso-motor (unless the slight œdema of the legs be considered vaso-motor) scarcely at all.

The photograph represents the patient as he appeared on April 1st, a good deal paralysed, but able to balance himself on crutches; a good deal of equinovarus.

Sensation is natural now (April 1st) and œdema has disappeared, he is rapidly improving, the motor fibres recovering last.

Whilst working at Abbassiyeh Hospital last year I saw several cases somewhat similar, one where the neuritis picked out the left arm and leg, and which I put down, in my ignorance, to syphilis because it got slowly well under pot. iod., although I confess there was neither sign nor history of venereal disease. He was about 22.

Another, a cavalry man, aged about 21, with a year's service, one night got up to have a drink of water and got a "fright." He was unable to rise next morn-

ing; he came to the hospital on a mule; he got worse, and soon became so paralysed that he could not put out his tongue or open his eyelids. He gradually got well, but I did not take full notes. He had no sensory disturbances, nor cardiac symptoms, his reflexes were absent, except for the superficial (cremasteric). He had no œdema when I saw him.

There have been lately also two cases in Abbassiyeh Hospital whose symptoms suggested beri-beri.

Now these were cases of peripheral neuritis, and what was the cause? The Egyptian soldier does not drink alcohol. They were not diphtheritic or syphilitic, or due to any of the usual causes of neuritis.

The case I have described in detail resembles in many

respects beri-beri,[1] but the fact that it was a single case, as were the others I have seen,[2] that sensation[3] was but little disturbed, gastrocnemii tendons not indurated, calf muscles not tender; that there were no cardiac symptoms in any of the cases, *e.g.*, vagus nerve[4] not affected, no serous effusions, and lastly, that no case of beri-beri has yet been reported in the Egyptian Soudan, or in Egypt (though it has been in the French Soudan).[5]

It would seem that a *rice* diet of itself might cause a neuritis, and some observers go so far as to say that beri-beri is so produced (Yamagiwa), and experiments show that fowls become paralysed after being fed on boiled rice, dying in a month,[6] nevertheless the rice theory of beri-beri is not supported by the majority of observers.[7] "Beri-beri" is common amongst the Lascar crews of the P. and O.,[8] and their diet is nearly all rice.

Rice is part of an Egyptian solider's ration, and Egyptians are great consumers: in some form it occurs with their food every day, whether as meat or drink, sometimes several dishes at a single meal contain it. In the Soudan it is greatly on the increase as an article of consumption, everyone eating it who can afford to buy it, although the Soudanese are very fond of meat. About one-eighth of the total consumed is grown in Egypt itself, the best coming from Rosetta, but seven-eighths of the rice consumed is imported from Rangoon, where beri-beri is common.

Rice Paralysis distinct from Beri-beri.

My thesis is that rice paralysis is distinct from beri-beri and produced by a distinct toxin, that the clinical points of difference are: that in rice paralysis the motor rather than the sensory fibres are affected; the vaso-motor system is not so much involved; the heart and vagi are unaffected, and so it is less fatal. It does not occur in epidemics.

It may be that rice paralysis is due to the toxin of a micro-organism. This theory would be helped by Captain Rost's[9] investigation of various rice liquors, and would find a parallel in the case of pellagra and ergot of rye poisoning, where it is the infected grain which is harmful.

I am very well aware that my reasoning is not conclusive, but it raises an important point in this country, where rice as an article of diet is increasingly consumed, whether when sound it is capable of producing a troublesome disease, or when unsound, or is it altogether harmless.

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[1] Paralysis of lower extremities with œdema.

[2] "Beri-Beri is an *infectious* disease and not a mere disturbance in nutrition."—Scheube.

[3] "Disturbances in sensation nearly always."—Scheube.

[4] "Vagus nerve nearly always affected."—Scheube.

[5] Suard.

[6] Eijkmann.

[7] Beri-beri occurs in countries where rice is not eaten.—Scheube.

[8] *British Medical Journal*, March 28th, 1903.—Dr. Keiller Moody.

[9] *Indian Medical Gazette*, December, 1900.

TROPICAL HYGIENE.

By W. J. Simpson, M.D., F.R.C.P.

Lecture III.

Water Supplies.

Surface Waters form a Common Source for Water Supplies, and Vary in Quality in the Highlands and Plains.—The whole of the rain which falls on the ground does not percolate into the soil to form the underground reservoirs referred to, a certain quantity is evaporated and the rest flows along the surface into the natural drainage channels of the country, forming lakes or rivers. The surface water derived from that portion of the rain which falls on the highlands of a country is generally, by reason of the sparsity of the population, very pure, but in its course down the hills and over the rocks it dissolves both mineral and vegetable matter and takes up micro-organisms and insoluble substances. If these are not in excess the water retains its excellence, It may, however, as is the case when it emerges from dense forests, contain an excess of vegetable matter, or, as in Darjeeling, the hill station of Bengal, take up in its downward course over the rocks a large amount of mica. Both these substances are apt to cause intestinal irritation and diarrhœa, but they can easily be got rid of by filtration, and in the case of vegetable matter its injurious influence can be prevented by boiling the water when there is no means of filtration.

Lakes, Natural or Artificial, containing Upland Waters give the Purest Supply for Towns.—The purity of lake water is due to the fact that the suspended matters subside and the large expanse of water permits of free oxidation. The still water, however, favours the development of the lower forms of plant life, such as *algæ*, but there is no difficulty in freeing the drinking water of these by screening and filtration.

Artificial lakes are often formed by building a dam or barrier across one of the principal streams which brings down the upland waters. The water so impounded gradually acquires the character of lake water. At first, owing to the flooding of land, which was either previously cultivated or covered with vegetation, the plants die and give to the water a disagreeable appearand taste, but this gradually passes away, the water in the lake becoming purer as time goes on. To prevent aquatic plants growing and afterwards decaying, which is likely to occur in shallow water the water in the reservoirs should be at least in every part twelve or fifteen feet deep. The Bombay water supply is an excellent example of pure water obtained in such a manner, so is that of Hong Kong. Both supplies, more especially the former, exhibited at first the peculiar taste and appearance so usual in water from newly-constructed reservoirs, but which at a later period disappear. The highlands are also used as gathering grounds by diverting the small streamlets into reservoirs, or by collecting from superficial land drains water that has partly penetrated into the soil and conveying it into reservoirs.

Purity of Surface Water in Reservoirs Depends on Certain Conditions.—In order that surface water col-

lected from gathering grounds shall be pure it is necessary that the land within the area of collection should not be cultivated, and if possible little inhabited. The Melbourne water supply is obtained from gathering grounds in the highlands nearly 50 miles from the city. In 1888 I had the opportunity of inspecting the gathering grounds there when typhoid fever was prevalent in Melbourne. The condition of affairs, since altered, I believe, fully explained the prevalence of typhoid. The inspection revealed the fact that, though sparsely populated, the lands around and adjacent to the reservoir were cultivated, and were a source of pollution, while the open conduits which brought the water into the town from the reservoir were subject to contamination from surface drainage. All surface supplies of this kind should be regularly inspected to secure purity, and for this purpose it is necessary to follow up the streamlets and their branches from which the water is derived, and to note that from their source to their entrance into the reservoirs there is no possibility of sewage, drainage, or dead carcases polluting the water. In some places there are two sets of reservoirs, one well out in the country, the other within the town, the former being the supply tank to the latter. It is not infrequent to find that great care has been taken over the prevention of contamination of one, generally that which is well away from the town, while the same precautions for the other are omitted. It is needless to say that under these circumstances the want of precaution in the one neutralises the good effect of careful precautions in the other. I have known instances in which town reservoirs have been placed in small gardens with the ground sloping towards the reservoir, and with the roads subjected to pollution, while the gardens have been the favourite resort for picnics. Under these conditions the first shower of rain brings contamination into the drinking water. It is false economy to be sparing in the amount of vacant and reserved land around a reservoir in or near a town, and it is dangerous not to so protect it as to render contamination impossible.

Gathering Grounds should, if possible, be Wooded.—It is important that the gathering grounds in the Tropics should be planted with trees, with a clear space of at least 200 or 300 yards around the reservoir. Trees in the gathering ground prevent the rain as it falls on the ground pouring down to the reservoir in torrents, and secure a steady flow. There is under the latter conditions less danger to the reservoir, and a greater supply of water to the reservoir, for should the water come down in torrents the reservoir is subjected to much stress, quickly filled up, and large quantities of water run to waste.

At the reservoirs the water is more likely to be carefully guarded against contamination than at any other point, whether it is in its collection and bringing to the reservoirs or in its passage to the distributing centre.

Great Danger of Open Conduits for Conveyance of Drinking Water.—Very frequently the water supply is conveyed from the reservoir to the distributing centre in open conduits, and these, if especial care is not taken, become polluted by the drainage of the district through which they pass. In the East they are also likely to be used for ablution purposes or the washing of dirty clothes, and in this way the water becomes contaminated. It is not uncommon, also, for the banks of the conduit to be defiled, and the rain carries defilement into the water. These and other sources of contamination render an open conduit in the East and also in other parts of the Tropics a source of danger. The habits of the people have to be considered, and the only safe precedure is to have pipes or a covered conduit.

In South Africa weirs are frequently built across spruits or streamlets, damming up the water in order to form a reservoir at the site of the weir, or to direct the water to a dam in a more convenient situation. It is a supply that is liable to pollution from the absence generally of any protective precautions. The custom of conveying the drinking water into the town in open furrows is one of the causes of the unusual prevalence of typhoid fever and dysentery among the civil population in South Africa. It often happens that the source of supply is absolutely pure, being obtained from a mountain stream or protected spring, but the water becomes contaminated before, or in the course of, its distribution, by being led into the town or village in an open furrow, which receives the drainage of the area of land through which it passes as well as the pollutions from cattle and domestic animals that drink from it. The furrow water consequently is the recipient of many impurities, inorganic and organic, and of vegetable and animal origin, before it is collected for domestic purposes. Natives have on occasion actually been caught emptying the contents of the excreta pails into the furrows.

The following is a description of one of these supplies taken from an official report, and it may be taken as a type which is to be found in many places. "From the dams the water is conveyed by open furrows along the sides of the streets, each erf having its own private furrow joining the public furrows. The dams are not fenced in, and in the dry season all the horses, cows, oxen, sheep and goats congregate in and near them. They are also the homes of countless water animals, especially frogs, crabs, &c., and yet these dams have not been cleaned out within the last ten years. Both of them are half silted up with sand and mud, so that they contain little water, and every year the amount gets less. The open furrows along the streets act also as drains or sewers; for on fall of rain all the refuse from the streets and back-yards is carried into them. The water from the dams is really intended for irrigation, but most of the poor people, white or black, habitually use the water for all domestic purposes, because it is so near at hand, running past their doors. This water is without doubt clean at its source, for it comes from the high mountains round the village, but all the small streams coming down the mountains, and the large spruits above the weir are constantly contaminated by the various animals feeding on the commonage through which they flow. It is not unusual to find some dead animal in an advanced state of putrefaction lying in these streams. All sick animals seem to make instinctively for water, and often in the death agony they tumble into the water. The carcase remains there until pressure is brought on the street keeper by some disgusted citizen. However, this has been effectually pu

a stop to by the drying up of all the streams. In ordinary times most of the washing of the clothes is done in that which passes the village, but early this summer the stream ceased to flow and water could only be found in one or two holes in the bed of the stream; still the washing went on in them till the water was almost solid with soap and filth and the smell could be felt for yards around."

The evil effects of a combination of unsanitary conditions are well exemplified in Middlesburg in Cape Colony. The town possesses many cesspools, and the inhabitants derive their drinking water from private wells on the house premises, many of which are insufficiently protected, and from a supply which is brought into the town in open furrows, which are practically gutters, on each side of the street. This supply at its source is pure, but as horses, cattle, dogs and cats drink from the furrows it soon becomes impure—an impurity which is increased by exposure to the surface drainage from houses. Dysentery and enteric fever prevail periodically, and careful investigations trace them to the water supply. In the year 1900, out of a small population of 2,000 inhabitants, there were 221 deaths from all causes, which is equal to an annual death-rate of 110 per 1,000 inhabitants. There are always every year from 50 to 60 cases of typhoid fever, and in 1900 there were 7 deaths from typhoid fever, 39 from gastro-enteritis, and 12 from dysentery.

The mortality rate for enteric fever in the chief towns of the Cape Colony was in 1896 for Europeans nearly eight times, and for coloured people ten times that in England and Wales.

Rivers as a Source of Supply of Drinking Water.—The next source of supply is the river, which in the Tropics, as a rule, is in a less polluted condition than in Europe. This is because rivers in the Tropics are generally of larger volume, also because the foulest of the sewage seldom reaches them by drainage, except at flood time, when the excrement and sewage on the ground is swept into the river, and because there are very few, if any, manufactories on their banks. On the other hand, until recently rivers in India used to be fouled by dead bodies thrown into them. This form of pollution is rapidly becoming a thing of the past. As drainage of towns is being introduced, unfortunately the most convenient outlet for the sewer appears to be often the river, without any attempt at sewage purification previous to discharge, and consequently the former fortunate condition of affairs tends to disappear. When stating this condition to be fortunate, I only refer to the dry weather and the heavy rainy season; in the one case the sewage soaks into the soil and does not contaminate the river water, and in the other case the water is so abundant that the contamination is enormously diluted.

The Water of Small and Shallow Rivers usually Dangerous.—The chief danger lies in the smaller rivers which may pass through thickly-populated localities, and which in the dry season are scarcely more than small rivulets, or a continuous line of puddles, or may dry up completely. At these times the river-beds become the receptacle of all kinds of pollution, and hence at the commencement of the rains the water in them contains a large amount of filth. The banks and the water itself are apt to be polluted by the inhabitants, when they come for water or to bathe. In South Africa after heavy rains the rivers may suddenly rise and become swollen and torrential, and almost as suddenly lower again, lessen in volume and swiftness, and become once more shallow streams. Cattle coming down to drink in these shallow streams often pollute the water by their excreta, and, in the case of animals in a debilitated state, not infrequently get stuck in the mud and die, thereby dangerously contaminating the water by their decomposing carcasses. If river water is used for the water supply of a town care should be taken that for several miles above the intake the banks on both sides for at least 100 yards in width are protected by means of fences from access to animals, and a regular inspection should be made to ascertain that nothing has fallen into the river, and that the fences are in order, and that no animals have succeeded in getting inside the fence; also that the tributaries within the area are free of pollution of any kind. If rivers are used in the Tropics for drinking and general purposes, and especially if they are small and have little water in them, arrangements should be made by which a certain portion of the river is set apart for the supply of drinking water, a certain portion for bathing, another portion for washing, and another for the use of cattle. The part used for drinking purposes should, of course, always be highest up the stream, and that for washing clothes lowest down. During the war in South Africa this system was not always adhered to owing to the lack of sanitary medical officers and of any special sanitary organisation. Apart from pollutions it was forgotten that the water of a pond, reservoir, river, or lake, is always inferior and contains many more organisms when the sediment is stirred up than when the water is drawn off carefully. In cases where the river water is much polluted and cannot be drunk with safety it should be boiled. In the Tropics all drinking water ought to be boiled if possible, as the chances of pollution by pathogenic organisms of different kinds are so very great. Abyssinian wells, or wells of a type such as have been already described, if sunken on the banks of a river, often give by filtration from the river a very pure water supply. Certain native tribes in South Africa never drink water direct from a river, but scoop out a hole on the banks and drink the water which filters through the soil from the river into the hole or well.

Tanks as a Source of Supply.—There is still another source of water supply which is used by many in the Tropics, and more especially in India, viz., ponds or tanks. They receive the rain which falls on the ground and which is conveyed to them by surface drainage. In many instances, as in Calcutta and in lower Bengal, where the land is low-lying, an immense number of tanks have been excavated, primarily for the purpose of supplying earth for raising the foundation of the huts to be erected and for the mud-plastered walls of the huts. The tanks soon become a convenient storage supply of water for the inhabitants of the huts, while at the same time they become receptacles for the drainage of the neighbourhood and of the huts.

Tank Water generally subjected to much Pollution.—The pollution to which these tanks are subjected is frequently very great. Most of them are defiled by men and women bathing in them, by dirty clothes often soiled by the excretions of the sick being washed in them, at times directly by human ordure, due to the practice of children and others defæcating on the bank of the tanks, and nearly always by the sulliage and drainage from the surrounding huts and houses.

The water, excepting during the *rainy season, varies in quality between diluted and concentrated sewage.* The range is shown in the following analyses. The first analysis is of water from a protected tank in which no bathing, washing of clothes or pollution by drainage is permitted; the next two are from tanks which are not protected, and the fourth is the water supplied to Calcutta, taken from the Hoogly, twenty miles above the town, filtered there and conveyed to Calcutta in iron pipes and distributed to the town.

	Chlorine.	Ammonia.		
		Free	Albu-minoid	Total
Maidan tank	20	0·06	0·09	0·15
Two tanks in native town	91	1·00	1·93	2·92
	318	32·00	35·08	67·08
Calcutta by direct water	4·9	0·00	0.02	0·02

The colour of the water of the tanks is often sufficient to condemn them. It is among the inhabitants dwelling around these tanks, and who drink the water or use it for domestic purposes, cleasing their utensils with it or soaking their rice or other food-stuffs in it, that there are periodical outbursts of cholera.

The tanks are not only periodically infected with cholera germs, but they form an excellent centre for all kinds of parasites. The ova of round worms, *Anchylostomia duodenalis* and filaria, dracunculus or guinea-worm—the intermediate host of which is a cyclops—are to be found in Indian tank waters, and are brought there by the pollutions which they receive.

These dangers may be avoided by raising the banks of the tank so as to prevent surface drainage flowing into it, fencing the banks to prevent the inhabitants washing their clothes therein or polluting the water in any other way, sinking tube wells or ordinary wells at the side of the tank so that the waters from the tank supplying these wells shall first of all percolate through a certain amount of soil, or lifting the water direct from the tank or well by means of a pump to a covered tank which is supported on pillars, and from which the water is drawn through taps. For bathing and washing purposes there should be a separate tank.

The Diseases Caused by Impure Water Form a very Large Division of the Diseases Incidental to Warm Climates.—Apart from microbic and parasitic diseases, the system is likely to be disordered and diarrhœa or dysenteric diarrhœa caused if there is in the drinking water an excess of mineral impurities or of dissolved organic matter. Large quantities of magnesium, sodium and calcium salts, suspended clay, mica or schist, an excess of vegetable or animal matter, will produce intestinal disorders. Brackish water usually causes diarrhœa among those who use it for the first time. On the other hand, excess of the alkaline carbonates or iron salts produces constipation. Drinking of water containing decomposing organic matter causes, when continued, a general low state of health with diarrhœa and attacks of fever. Any water containing a large number of bacteria will cause diarrhœa.

The most frequent cause for the prevalence of diarrhœa and muco-enteritis in the Army in the South African War was the drinking of unfiltered surface waters, especially those of rivers which contained a large amount of mineral and organic matter in suspension. The water of such rivers as the Orange, the Modder, the Vaal, the Eland, and the Crocodile were at times so loaded with suspended earthy matter as to be quite opaque, and when used as drinking water produced mechanical irritation of the bowels, developing later into muco-enteritis.

Diarrhœa and dysentery were also caused by drinking water containing decomposing animal matter, such as dead carcases of horses and cattle in a state of putrefaction.

Malarial fever was formerly in the list of diseases caused by water contaminated with jungle *débris*: it must, however, now be erased in view of the discovery of the transmission of malarial fever by the mosquito, if inoculation is the only mode of entrance into the human body. It is not improbable that certain so-called malarial fevers are not due to the malarial parasite, and may be caused by drinking impure water. No doubt there are many unclassified fevers, which at present are not discriminated from the malarial fevers; and it is most likely because of this that malarial fevers have been on occasions attributed to drinking water contaminated with decaying vegetable matter. There is evidence to show that fevers have followed the drinking of waters from a marsh. These fevers have been diagnosed as malarial, but that diagnosis has not been based on microscopical examination of the blood. Further investigation is needed on this subject. Impure water serves as a vehicle for the ova and embryos of entozoa. The *Bothriocephalus latus*, *Tœnia echmococcus*, *Distoma hepaticum*, *Ascaris lumbricoides*, *Ankylostomum duodenalis*, *Dracunculus medinensis*, *Filaria sanquinis hominis* and leeches may all gain access to the human body by means of the drinking water.

Among microbic diseases caused by contaminated water, cholera, typhoid fever, epidemic diarrhœa and dysentery are the chief.

Isolation of Disease Microbes from Water.—There is no difficulty in detecting the cholera microbe in water. The ordinary routine in Calcutta when any outbreak of cholera occurred was to discover the tank which contained the microbe. As there was likely to be several tanks in the neighbourhood of the outbreak it was important to discover which was producing the disease. For this purpose several samples of water were taken from each tank in the vicinity of the outbreak and carried to the laboratory. There 3 or 4 cc. of each sample were put into sterilised wine-glasses, containing a solution of peptone of the strength of 2 per cent.

with ·5 per cent. of chloride of sodium. The wine-glasses were covered with sterilised paper and put into the incubator at 37° C. Next day in those which contained cholera microbes there was a pellicle on the surface, which, on examination microscopically, was found to consist largely of comma bacilli. Sometimes commas were not noticeable, only short rods were to be seen. Under these circumstances tubes containing sloping nutrient agar were inoculated from the wine-glasses by zig-zag impressions, and on the next day characteristic commas could be detected. In this way the tank or other infected source of the outbreak could be detected; suspicion was thus converted into a certainty, and instead of having to carry out some general measures, which might not really touch the true source of infection, special measures were directed at once to the source. In the case of tanks the precaution taken was to place a police guard over that proved to be contaminated, in order to prevent the inhabitants using its water either for domestic or other purposes until it could be emptied or cleansed. It was found that if a guard was placed over a tank for about three weeks, by the end of that time the comma bacilli had generally died out, and that usually it was safe to allow the water to be used again.

It is a very different matter to identify the typhoid bacillus, and no certain method has so far been discovered. The typhoid bacillus is much more difficult to isolate from a contaminated water, the reason being that other bacilli—particularly those of the colon group—multiply at a much more rapid rate, overgrow and conceal the typhoid bacilli. I have found the Elsner's process the most servicable in hot climates, with the modification of using agar instead of gelatine. The Elsner medium consists of slightly acid potatoe gelatine, containing 1 per cent. iodide of potassium. The watered to be examined is generally filtered through a Berkefeld or Chamberlain-Pasteur filter, and the residue left on the filter is scraped off and placed in 10 cc. or 100 cc. of sterile water. From this mixture a dozen plates with Elsner's medium are inoculated. At the same time 1 cc. of the mixture is placed in tubes of 10 cc. of broth, to which Parietti's solution is added, so that the tubes contain 0·05, 0·10 and 0·15 per cent. of carbolic acid. The carbolic acid possesses the power of repressing the growth of saprophytic organisms. Those tubes in which a growth takes place are then inoculated on to plates or tubes containing Elsner's medium. On the Elsner plates the typhoid bacillus appears in about forty-eight hours as a small pellucid growth, while the colon bacillus grows more rapidly, and shows a more distinct and brownish-coloured colony. It is necessary to make subcultures of the typhoid-looking colonies on nutrient agar, or again on Elsner, and when pure cultures are obtained to test them as to their genuineness. For this purpose the cultures which are suspected to be typhoid have to be subjected to the following tests: (*a*) *Microscopically* examined they are motile; (*b*) *culturally*, they do not redden or coagulate litmus milk, form no gas in lactose gelatine or lactose broth, grow on gelatine plates as pale, colourless, small, generally circular colonies, slightly granular in appearance; on the surface of the gelatine colonies grow as leaf-like expansions, grow on gelatine slope along track of needle, but with no disposition to spread laterally; exhibit on potato a colourless growth; (*c*) *chemically* give no indol reaction in peptone broth, agglutinate with blood serum from typhoid fever cases at a dilution of over 1 in 20. The conclusion has to be based on the combined results and not on one or two tests.

Purification of Water for Drinking Purposes Essential at all Times.—With the great risk of pollution of drinking water and the various diseases to which impure water gives rise in the Tropics, there is much reason to arrange for some method of purification. Of such methods to render a water wholesome, one is directed to the disinfection of an infected well or tank; and others are directed to the purification of the water by various processes, such as distillation, precipitation, boiling and filtration, which may be carried out on a small or large scale.

The disinfection of wells and tanks has been for many years occasionally practised in India; but since Mr. Hankin drew attention to the excellent results which followed from the addition of permanganate of potash to cholera-infected wells the practice has been more systematic. Into an infected well a quantity of permanganate of potash is poured, which shall give a measurement of 1 in 4,000 of the well water. If this quantity, owing to the large proportion of organic matter in the well, does not render the water pink for at least half an hour, more should be added until this standard is obtained. Roughly, 4 oz. for an ordinary well are sufficient. The permanganate should be first dissolved in a small vessel, which can then be let down into the well, sinking it to the bottom, then withdrawing it rapidly with the object of stirring up the water in the well and thoroughly mixing the permanganate. Some very good results have been reported of the efficacy of this method of treating infected wells. It is best to treat the well in the evening, so that by next morning all colour has disappeared. If the colour still remains, the addition of alum will soon render the water colourless. Lime to the strength of 1 oz. to the cubic foot of water has also been used for disinfecting purposes.

The ordinary methods of purification are distillation, precipitation, boiling and filtration. Distillation has already been described.

For precipitation, various vegetable juices containing tannin have been used. The tannin coagulates the organic matter and allows it to be deposited. The Indians in South America purify ponds with logs of Peruvian bark. The natives of India often use the clearing nut, which is the fruit of the *Strychnos potatorum*. They rub it on the inside of the water vessel. In other places tea and kino are favourite agents for this purpose. For travellers there is no better and safer drink than cold tea; it ensures that the water is boiled, the tea leaves act as a strainer of suspended matters, and the tannin coagulates and precipitates the organic matter, forming insoluble tannates. Chemical agents such as alum and lime are useful for precipitation purposes.

The addition to muddy and impure water of alum in the strength of 6 grs. to the gallon is a process which has been long in use in the East for clearing and purify-

ing drinking water, and if 5 grs. of lime are added after the alum the clarifying effect is rendered still better. On the addition of the alum a floculent precipitate of alumina forms, which absorbs the colouring matter in the water, entangles the solid matter in suspension, and gradually sinks to the bottom, leaving a clarified water above.

Alum is not only an excellent clarifier of water, but destroys water bacteria. Half a grain of alum to a gallon has been shown to reduce 8,100 micro-organisms in 1 cc. of water to 80; while 2 grains, or even less, to a gallon has rendered the clear water after standing for twelve hours sterile, and left only a small number of microbes in the sediment. It is curious, however, that though alum appears to have this destructive power over water bacteria, it does not destroy in these or even greater strengths the typhoid or cholera bacillus. A mixture of alum, lime and sodii carbonate in powder makes up the anti-calcaire which is used in Maignen's process.

Permanganate of potassium or sodium is very useful for removing the odour from an offensively smelling water. To treat such waters add a few grains of permanganate of potash, and then heat gently and continue to add until a pink tinge remains for fifteen minutes.

In the case of hard water, various processes are used on a large scale for softening it. Every process of this kind contains lime. There is Clark's process, Maignen's and Howatson's. Besides softening the water they lessen its organic matter.

Iron is another agent used for purifying water. Anderson's process consists in subjecting the water during its passage through revolving drums to the action of a continuous shower of metallic iron. The water afterwards passes over cascades to remove dissolved iron by oxidation, is then allowed to settle in tanks, and is finally filtered through sand. This process is in use at Antwerp, Worcester, &c., and it is found particularly useful for Nile water, which is clarified in a very short time after.

Boiling, or, as it has been called, the tea-kettle policy of treating water, is a method which has been employed both on a large and small scale in India and elsewhere. When properly done it destroys all living germs, and at the same time reduces hardness. The difficulty in hot climates with this method is cooling of the water afterwards. On a small scale this is often effected by putting the water into a clean earthenware vessel, which is suspended so that it may be well exposed to air currents. On a larger scale the cooling has been attempted by exposure of the pipes containing the hot water to the air currents. Neither of these methods of cooling can be said to have been very successful, and a simple and inexpensive system has still to be discovered. Water has been sterilised under pressure so that none of the gases have been lost, and attempts have been made to extract the heat from the sterilised water by the colder water that is passing to supply the steriliser.

There are a number of sterilisers in the market having for their object the purification of drinking water. Such are the Forbes Water Steriliser, the Maiche Automatic Water Steriliser, and the Geneste Water Heat Steriliser. The objections usually brought against sterilisation of water by heat are that it is expensive on a large scale, and that if the water is hard there will gradually be a deposit in the pipes of the apparatus, which will interfere with efficiency and add to the cost. Doubtless both these objections will be ultimately overcome by the ingenuity of those interested in the process.

The Forbes Water Steriliser is an American invention, and is well reported on by a Sanitary Board of Medical Officers after careful testing. The Board recommended its issue for the use of troops in the field, finding that it was effective in purifying water which was heavily charged with the typhoid bacillus, the colon bacillus, or the *Bacillus prodigiosus*, all of them having been destroyed by the process of sterilisation.

The advantages claimed for the steriliser are: (1) That the water passing through the steriliser, although brought to the boiling point, is maintained at this temperature for so short a time as not to be deprived of its natural gases, and hence not rendered unacceptable to the taste. (2) That all living micro-organisms except a few spore-bearing bacteria are destroyed by the degree of heat attained during the passage of the water through the apparatus. The disadvantage of the escape of a few spore-forming bacteria through this apparatus is considered to be of no practical importance. (3) It furnishes an abundant supply of practically sterile water, and may be kept in action, if necessary, for the entire twenty-four hours without renewing the supply of oil in the reservoir. (4) The water having been slowly heated until it reaches temporarily the boiling point, is afterwards cooled to within $4\frac{1}{2}°$ F. of the water entering the apparatus. (5) Its durability and freedom from liability to breakage. (6) The facility with which the apparatus may be put together and entirely taken apart. (7) The facility with which the apparatus can be thoroughly cleansed.

(*To be continued.*)

Dr. S. W. Thompstone, who recently sent specimens of *Filaria loa* to Dr. Patrick Manson, who presented them to the London School of Tropical Medicine, wishes us to mention that he obtained them all from Opobo, Southern Nigeria, and not from the Congo, as was inadvertently stated in our issue of May 1st, 1903.

The British Ophthalmic Hospital at Jerusalem.—The surgical report for the year ended September 30th, 1902, states that 674 in-patients were treated in the hospital and 6,062 new patients in the out-patient department. Of the 1,271 operations performed, the largest percentage was for trachoma; 62 cataract extractions were performed, and many cases of "Egyptian ophthalmia" were treated. The excellent work being done at this hospital, which is maintained by the Order of St. John of Jerusalem in England, is testified by the crowds of patients which seek the advice of the medical staff. Dr. Cant has for twelve years conducted the work of the hospital, and it is satisfactory to note that, with the enlargement of the hospital to 50 beds, he is to be in future assisted by Dr. T. Harrison Butler.

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FOURTEENTH INTERNATIONAL MEDICAL CONGRESS,

HELD IN MADRID, APRIL 23RD-30TH, 1903.

IN the Teatro Real, Madrid, on April 23rd, Professor Julián Calleja y Sánchez, the President of the Congress, opened the proceedings in the presence of His Majesty King Alphonso XIII., by an address entitled "The Progress of Medical Science."

The number of delegates who had registered their presence on the opening day of the Congress amounted to 5,000, and the approximate numbers from countries outside Spain and Portugal were as follows: Germany and Austria 1,000; France 825; Italy 335; Russia 290; Britain 235; other European countries 327; United States 193; South America 136. During the Congress some 7,000 names were entered on the register.

Of subjects specially appertaining to tropical medicine, so far as our information goes, there appears to have been but few. Dr. Ian MacDonald, Huelva, Spain, read a paper on malaria. Dr. Juán Santos Fernandez, of Havana, compared the

OCULAR AFFECTIONS IN A HOT COUNTRY

with those of temperate and cold climates. Dr. Fernandez stated that: (1) Blepharitis is rare in Cuba, due, possibly, to the infrequency of the tubercular diathesis; (2) hordeolum and chalazion prevail in consequence of the anæmia and consequent lack of tone in the tissues; (3) filarial ocular affections in Cuba were met with as (*a*) *Filaria medinensis* in negroes, (*b*) *Filaria oculi humani*, found in one case in the vitreous and in a second case in the anterior chamber; (4) *Pulex penetrans*—nigua chique—at one time prevalent in Cuba, is now rarely met with; (5) purulent ophthalmia of the newly born occurs in a less virulent form in Cuba than in colder climates; (6) blennorrhagic ophthalmia in the adult exists in an intractable form; (7) trachoma is rare in Cuba; in the cases met with Fernandez found treatment by jequirity of value; (8) leucoma is a common affection, and although due to small-pox in some instances, the prevalent cause of the affection was keratitis; (9) diseases of the lachrymal passages occur frequently amongst whites; (10) iritis due to rheumatism and to syphilis is of common occurrence; (11) glaucoma and (12) cataract prevailed in almost the same proportion in Cuba as in colder climates; (13) amblyopia nicotiniana is uncommon; (14) to malaria is ascribed several of the cases of retinal hæmorrhage, optic neuritis, iritis and keratitis met with; (15) quinine amaurosis is also recorded; (16) in the course of yellow fever, ocular congestions, phlegmon of the eyelid, suppurative keratitis, sloughing of the cornea, and panophthalmitis have been observed.

An acute form of conjunctivitis, occurring in an epidemic form amongst children, and termed locally ceguera (blindness), is notified by Fernandez, in which, in the muco-purulent discharge, the bacillus of Weeks and the diplococcus of Morax were isolated. Granular lids and a previous attack increased the liability to infection, which is

supposed to be carried by a small insect known in Cuba as the "guassasa." Although the conjunctivitis is severe and very painful, the prognosis is good.

"The Pathology of Heat-Stroke" was the title of a paper read by Dr. Antonio Vidal. Dr. Vidal's experiences of the disease were gained in Buenos Ayres.

Award to Professor Grassi.

The Paris Prize, value £120, was bestowed upon Professor Grassi, of Rome, at the Medical Congress in Madrid, for his researches on malaria. We congratulate Professor Grassi on his gaining the prize, and we are glad to know that the enthusiasm, devotion and many years of hard work, devoted to the advancement of our knowledge of malaria by this savant, have been recognised by his contemporaries.

ENTERIC FEVER AND DYSENTERY AT STANDERTON.

After so much has been said of the losses which the British Army suffered from in consequence of enteric fever and dysentery, and of the assurances that measures had been taken to remove those conditions which are well known to be the causes of these diseases, it is disappointing to read the notes by Mr. Myers Coplans, M.B., on the insanitary condition of Standerton, which we publish in our present issue. Mr. Coplans has recently returned from South Africa, having acted as one of the R.A.M.C. Civil Surgeons at one of the hospitals at Standerton, so that his description is not of things of the past but of a condition of affairs which actually exists now, or did so until a few months ago. It is a tale which we hardly expected to learn, for we were under the impression that the Army authorities at least were, after the sharp lesson in the campaign, alive to the necessity of preventive measures, and had taken every precaution in their power to lessen those dangers to the soldier which can be effected by ordinary sanitary administration.

It seems we were mistaken, for now there appears to be on a small scale the same inattention to sanitary matters as was so conspicuously the case during the war. Standerton is not an unimportant place, seldom visited by troops, but has been a standing camp since 1900, and a station through which many divisions and brigades have at one time or another passed. Ordinary people would therefore have thought that some special measures would have been taken to secure a fair degree of sanitation. Instead of this we find that from the Vaal river an unfiltered supply of water, liable to serious pollution, is distributed to civilians and military alike. One supply is taken from a source below the drainage area of the cemetery and of a portion of ground used as an outspan for convoys; while the other, before being pumped up from the river, receives the sewage from the burghers' camp, the drainage from the hospital cemetery, and the pollutions from that part of the river at which the animals drink and from the reach in which the dirty linen of the inhabitants is washed. It is this quality of water that supplies the railway station through which, as remarked by Mr. Coplans, thousand of troops passed during the war.

We have heard a great deal of the inevitable sickness which must occur in armies. Dust storms and other climatic factors are freely quoted by apologists as predominating agents in the production of disease; but it is significant that in any inquiry into the actual condition of things we are forcibly brought back to a neglect of the ordinary canons of sanitary law, and that the only inevitableness likely to be discovered is an absence of sanitary administration.

W. J. S.

HONG KONG.

College of Medicine for Chinese.

We have received the prospectus of this College for 1903. The College is now in the eighteenth year of its existence and continues to do excellent work. Since the opening sixty-eight students have been enrolled, and seventeen have been certified as fit for the practice of their profession. The minimum course of study is five years, and all professional examinations are conducted by independent examiners. Of the students who have qualified L.M.S.H. (Licentiate in Medicine and Surgery, Hong Kong), three are in the service of the Selangor Government, two are employed

by the Hong Kong Government, one by the Perak Government, three are engaged in private practice in Hong Kong, one in a similar capacity in Selangor, one in Penang, and one in Manila.

This useful institution has continued to flourish, in spite of the want of Government financial support, by the devotion and self-sacrifice of a few medical men in the Colony. Of the original staff of teachers in the College we are glad to see that the Hon. Dr. Ho Kai, Dr. Gregory P. Jordan, J. W. Noble, D.D.S., and Dr. John C. Thomson, the indefatigable Secretary of the College, still continue to give their valuable services. For many years also, Dr. Francis W. Clark (Dean), Dr. Alex. Rennie, Dr. R. Maclean Gibson, Dr. Wilfrid W. Pearse, Dr. G. Montague Harston, Dr. William Hunter, Dr. F. W. Lambelle, and Mr. William J. Tutcher have devoted their time and given their services, without remuneration, to the College. Surely the efforts of these gentlemen through these many years will soon be rewarded by the establishment of the College on a basis which will allow of its being carried on and extended to a degree befitting the noble work they have at heart, and for which they have done so much. The College has enjoyed the patronage of successive Governors of the Colony, and it only remains for a Governor who has the welfare of the Chinese at heart to take the matter up and thereby give further proof of the traditional munificence of British rule by establishing the College on a sound basis. The Governor of the Colony is Patron, and the Hon. Francis H. May, C.M.G., the Rector, of the College.

In Sir William Blake, K.C.M.G., Hong Kong has a Governor in close touch, and in earnest sympathy, with the Chinese; and we would urge him in the interests of humanity and for the honour of Britain to see to it, before his period of office terminates, that this deserving institution is placed on a footing of stability. The introduction of Western medicine to China is a work of practical humanity which must commend itself to all mankind, and seeing that the Chinese are anxious and willing to learn, and that the small devoted band of medical men in the Colony have proved their readiness to help, it only remains to find a strong man in authority to confer the greatest blessing to China which it is possible for Britain to bestow.

Correspondence.

ZANZIBAR WATER SUPPLY.

SIR,—Dr. Simpson's lecture on "Tropical Hygiene," published in your last issue, contains a quotation concerning the drinking water supply of Zanzibar happily no longer applicable to things as they are to-day.

From an unfailing spring in the hills, more than two miles away, an ample pipe service conducts water in abundance to various public stocks placed about the city, around which "water-women" ever swarm in insatiable demand—one of the "sights of Zanzibar."

Moreover, water is "laid on" to certain institutions and private houses; while it flows freely in the public gardens, notably in crystal clearness in the Great Baths of the late Sultana's and the Harem Garden, now thrown open to the public.

Samples of the water are periodically sent to Bombay for analysis; and the best proof of the Reports obtained is that all the ships of the many East Coast shipping lines regularly "take water" at Zanzibar, and ship captains describe it as the best and cheapest water on the African coast.

The "dipping-well" scenes may still be witnessed on the outskirts of the city, as the well and swamp water, from its great alkalinity, is preferred for washing purposes. If drunk, it is not from "Hobson's choice."

Following these changes, though Zanzibar is not yet a health resort, it can be no longer described as "extremely unhealthy."

I am, Sir, faithfully yours,
A. H. SPURRIER,
Medical Superintendent of "Prison Island," Sanitary Station, Zanzibar.

THE JOHNSTON LABORATORIES, LIVERPOOL.

ON May 9th, the President of the Local Government Board, Mr. Walter Long, M.P., opened the new laboratories of the University College, Liverpool, provided by the generosity of Mr. William Johnston. Many distinguished scientists from the continent were present at the ceremony, including Professor Ravenal (U.S.A); Professors Blanchard and Nocard (France); Professors Eulenberg and Weigart (Germany); Professor Perroncito (Italy), and Professors Sleegmann and Uhlworm (Holland).

The laboratories are to be devoted to investigations in Pathology (Dr. Annett); Tropical Medicine (Major Ronald Ross, F.R.S.); Cancer Research (Dr. Grünbaum); Bio-chemistry (Professor Moore); and Experimental Medicine under the superintendence of the Professors of Pathology and Physiology.

Mr. Long congratulated the School of Tropical Medicine in Liverpool upon the valuable work it had done in the past, and hoped that the work so well begun would be continued. In the evening, Mr. William Johnston entertained at dinner the visitors and the majority of the scientists and public men who had attended the opening of the laboratories.

Notes and News.

THE report of the Registrar-General of Jamaica, Mr. S. P. Smeeton, for the year ended March 31st, 1902, states that: (1) The population amounted to 770,242, (2) the birth-rate to 40·9 per 1,000, (3) the death-rate to 21·9 per 1,000; (4) of the total deaths, amounting in all to 16,756, there were 3,327 returned as due to "fever undistinguished"; 2,005 to "other ill-defined and not specific causes." Measles accounted for 33 deaths, influenza 156, enteric fever 7, and yellow fever 6. No less than 79·7 per cent. of the deaths were registered without any medical testimony as to the cause of death.

These figures testify to the impossibility of obtaining accurate information as to the nature of the ailments which are prevalent in Jamaica (and other colonies), seeing that in one-third of the deaths the cause was assigned to "fever" and "to othercauses."

On March 21st, 1902, the medical practitioners in the island numbered 128.

X-ray Dermatosis.—Prince (*Phila. Med. Journ.*, August 9th, 1902) states that "as regards treatment, Lussar's paste caused only temporary relief; tar, salicylic acid and ichthyol was not beneficial. The best application was ol. morrhuæ, zinc oxide and lanoline.

A meeting was be held at the Polyclinic on May 15th, Lord George Hamilton, Secretary of State for India, in the chair, at which Mr. Jonathan Hutchinson reported the result of his tour in India, and the information he collected concerning the use of unwholesome fish as food in the etiology of leprosy. We hope to report the proceedings in our next issue.

Treatment of the Morphia Habit.—The sudden withdrawal of morphia in the case of morpho-maniacs is commonly believed to be dangerous, and to be attended by acute suffering to those compelled to relinquish the habit. The "tapering off" process is therefore the plan generally commended, either by a gradual reduction of the quantity or by substituting some other form of medicament. The question frequently arises as to the form of drug to be used as a means of weaning the patient from his (or her) deleterious habit and of curing the craving. Dr. Margaret Hulleck (*New York Medical Record* of April 11th, 1903), has tried the following hypodermic injection in five cases which came under her charge :—

R. Strychniæ sulp. ...	..	.. gr. $\frac{1}{60}$.
Codeiæ sulp. ..	..	.. gr. $\frac{1}{4}$.
Hyoscine ..	..	.. gr. $\frac{1}{200}$.

In sterile aqueous solution.

The injection was given at bedtime and continued for a week; during the second week, gr. $\frac{1}{60}$ of strychnine was given alone, when all medicinal treatment was left off. In every case the treatment was successful.

Practitioners in the East must be acquainted with many cases of persons suffering from the opium habit who, when sent to gaol, are compelled to relinquish the habit, and in whom no deleterious consequences are known. It may be that in the case of opium maniacs, as in inebriates from alcohol, we are all rather wedded to the belief that to suddenly relinquish the habit is attended by danger. There seems no real testimony in favour of retaining this belief.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Liver.

Angio-sarcoma of the Liver, by Cook. *Journ. of the Amer. Med. Assoc.*, No. 13.—The author reviews the etiology of such neoplasms and gives the history of a case.

Widal'sche Serumreaktion bei Leberabszess [Widal's Serum Reaction in Abscess of the Liver], by Megale. *Münch. mediz. Wochenschr.*, 1903, No. 14.—In three instances the typhoid agglutination test gave positive results, yet at the autopsy no trace of typhoid was found; there was, however, a large hepatic abscess, which had apparently originated from otitis media.

Malaria.

The Typhoid Type of Malaria, by Albert Billet. *Revue de Medecine*, December 10th, 1902.—In Algeria, according to Billet, there is a type of malaria which in about 10 per cent. of the cases can be readily mistaken for typhoid. The points of differentiation are found to be: the course of the temperature, the presence of the malarial parasite in the blood, and a mononuclear hyperleucocytosis with predominance of large mononuclear pigmented cells. Of the negative signs the absence of Widal's reaction is the most definite.

Billet further remarks that quinine administered in the early stages may cut short the symptoms, but if not successful in so doing it changes the type of fever from being continued to being intermittent.

Ueber Einheimische Malaria und Malaria Kachexie [Endemic Malaria and Malarial Cachexia], by Dr. Reckzeh. *Deutsche med. Wochenschr.*, April 30th, 1903.—Dr. Reckzeh reports three cases of endemic malaria occurring in Berlin. One was the case of a girl, aged 23; the second, a boy, aged 8, and the third a boy, aged 13. In the blood of all these patients the tertian type of parasites were found. A fourth case described by Dr. Reckzeh is that of a woman, aged 32, who had acquired malaria in Buda-Pesth, and who also suffered from carcinoma of the stomach.

Sulla malaria nella guarnigione di Roma del gennaio al luglio, 1902, e sui rapporti della malaria recidivale collo scoppio della nueva epidemia [On Malaria in the Suburbs of Rome, from January to July, 1902, and a Report on Recurring Malaria, with the Scope of the Recent Epidemic], by G. B. Mariotti Bianchi. *La Riforma Medica*, 1903, No. 12.—Crescents were only found in the blood of malarial patients up to the end of March. There were local epidemic differences in various parts of Italy; and a coincidence of the onset of attacks of fevers and the appearance of parasites. In some epidemics there was a combination of tertian and quartan infection.

Zur Therapie des Ruckfallfiebers [The Treatment of Relapsing Fever], by J. Karlinski. *Wien. klin. Wochenschr.*, 1903, No. 15.—The author has discovered that the vitality of the spirilli of relapsing fever is considerably lessened by adding common salt to the serum containing them, otherwise they remain viable for a considerable time. On this observation he bases the hope of stemming recurring infection by subcutaneous or intravenous injections of solution of salt.

Miscellaneous.

Kurze Bemerkung über Seekrankheit [Sea-Sickness], by O. Dornblüth. *Münch. mediz. Wochenschr.*, 1903, No. 14.—The author advises that 2 to 3 gm. of bromide of potassium should be taken on the evening before going on board. When the ship is pitching deep inspirations should be taken during the dip.

Ueber die natürliche Milzbrand immunität des Hundes und des Huhnes [On Natural Immunity to Anthrax in the Dog and the Fowl], by A. Pettersson. *Centralb. für Bakt. Paras. u. Infektionskrankheiten*, 1903, vol. xxxiii., No. 8.

Die Differentialdiagnose des Typhus bacillus vom bacterium coli auf Grund der Säurebildung [The Differential Diagnosis of the Typhoid Bacillus from *Bacterium coli* on the Basis of Acid Formation], by A. Wolff. *Centralb. für Bakt. Paras. und Infektionskrankheiten*, 1903, vol. xxxiii., No. 8.

Bericht über das Choleralazareth Shin-Jang-tse zu Tientsin von seiner etablirung am 13 Juni bis zur Uebergabe an die Chinesische Regierung am 15 August, 1902 [Report on the Cholera Hospital, Shin-Jang-tse at Tientsin, from its Establishment on June 13th to its Surrender to the Chinese Government on August 15th, 1902], by Busch. *Deutsche militärarztliche Zeitschr.*, 1903, No. 3.

Ueber Fixationsbilder von Leberzellen im normalen Zustande und bei Arsenikvergiftung [On the Appearance of Normal Hepatic Cells, and their Appearance in Arsenical Poisoning (when fixed)], by Schmaus. *Centralb. für allegemeine Pathologie und Pathologische Anatomie*, 1903, vol. xiv., No. 6.—The author states that the structural form of those parts of the organ taken from the periphery is always different in fixed preparations to those obtained from other parts; and he attributes the difference to the fact that in the marginal structure a copious amount of fluid is conducted suddenly to the cells, whereas in the other parts the fluid is introduced slowly, and the fixation ensues in a more granular, reticular form.

As to the "cloudy swelling" in arsenical poisoning, observable in fresh preparations examined in water or in salt solution, the forms met with were caused by the effect of the "indifferent" fluids.

Untersuchungen über natürliche und künstliche Milzbrandimmunität [Researches Regarding Natural and Artificial Immunity to Anthrax], by Bail. *Centralb. fur Bakt. Paras. und Infektionskrankheiten*, 1903, vol. xxxiii., No. 8.—These researches were undertaken to show that there are two factors present in the body of the rabbit differentiated by their behaviour to heat amounting to about 8° C.

Preliminary Report on Tse-tse and Animal Malaria in the Coastal Regions of Cameroon, by Staff-Surg. Dr. Ziemann, State Surgeon in Duala. *Deutsche Medizinische Wochenschrift*, April 9th, 1903. Extracted from the German by P. Falcke.—Dr Ziemann has already reported the discovery of a disease amongst asses, mules and horses, on the coastal districts of Cameroon, that bears a certain resemblance to human tropical malaria, and is still more like the Texas fever of cattle.

More recently the author confirmed the disease in sheep and goats from the coast, and found that their blood contained forms resembling malaria parasites. This animal malaria is particularly deleterious to asses, but once the animals have recovered they seem to acquire immunity. On the basis of this knowledge Dr Ziemann suggests that animals should be immunised on the principle he introduced in Germany for "hæmaturia of cattle." The process consists in subcutaneous injection of the young suckling animals with the blood of animals that are suffering from the disease, acute or chronic. The young animals acquire the disease, but in a very light form, and thus become immune.

In Venezuela this method of innoculation has opened up the possibility of importing cattle for the improvement of the native strains.

In 1900 Dr. Ziemann previously expressed his conviction that tse-tse certainly occurred in the hinterland of Cameroon, and this conviction has been confirmed by Dr. Zupitza's finding the tse-tse parasite in horses from Adamana. Recently, also, Professor Ostertag confirmed the incidence of the disease in the south of Cameroon. Dr. Ziemann was also able to identify a fly, nearly related to the tse-tse fly, in Old Calabar and Bonny.

He had not given his attention to this subject more than ten days when he discovered tse-tse parasites in the blood of an ass suffering from "animal malaria." He then systematically examined the blood of forty-one sheep and goats from Edea, Jabassi and Suellaba, and in a large percentage the tse-tse parasites were more or less present. The investigator, however, found that the parasites in Duala differed from those he had previously discovered in Togo, inasmuch as they were longer, more slender, and possessed of greater motility.

The conclusions arrived at are therefore:—

(1) That not only in Adamana but seemingly along the entire coast of Cameroon the tse-tse is found.

(2) That a kind of malaria also occurs amongst sheep, goats, asses, mules, horses and dogs in Cameroon.

(3) The above-mentioned veterinary diseases are apparently not known in the English Colony of Old Calabar.

Plague.

Active Immunisation against Plague, Cholera and Typhoid, by M. Besredka. *Ann. de l'Inst. Pasteur*, December, 1902.—Active immunisation, by which is meant the injection of virulent cultures or of attenuated

or dead cultures, is not without risk. The passive immunisation with immune serum, although safer, is only possessed of a transitory power of protection. It occurred to M. Besredka that could the passive form, which affords speedy immunisation combined with efficiency and no risk, be combined with the active form, a real advantage would be gained, whereby prolonged immunity is obtainable. With agar cultures of the plague bacillus, suspended in physiological salt solution, heated for an hour at 60° C., Besredka mixed anti-plague serum. In this solution the bacilli agglutinate and sink, and are separated from the serum by repeated washing with salt solution. It is these washed bacilli that are used as "vaccine" material to produce immunity, and this is procured without the development of alarming symptoms. The combined "vaccine" procures early immunity in animals, and does not render the animal liable to infection during the period of incubation (twelve days) as in the case of the active method by itself. Immunity by the combined "vaccine" is obtained in forty-eight hours in plague, and in twenty-four hours in cholera and typhoid. A real step seems by this method to have been made in the matter of active immunisation.

Plague—Prevalence o the Disease.

India.—During the weeks ending March 28th, April 4th, 11th and 18th, the deaths from plague in India numbered 32,078, 34,000, 27,787, and 32,159. During the last mentioned week the deaths from plague in the Punjab alone amounted to 18,488.

Cape Colony.—Port Elizabeth: During the weeks ending April 11th and 18th, the fresh cases of plague numbered 12 and 7 respectively, and the deaths from the disease 6 and 5.

East London.—Fresh cases 0 and 1, deaths 0 and 1.

King William's Town.—Fresh cases 3 and 2, deaths 2 and 3. Plague-infected rats have been found at the above-named towns, and at Graaff-Reinet and Burghersdorp.

Mauritius.—During the weeks ending April 30th and May 7th, the fresh cases of plague numbered 1 and 1, and the fatal cases 1 and 1, respectively.

Hong Kong.—During the weeks ending May 2nd and 9th, the fresh cases of plague were returned as 95 and 98, and the fatal cases as 83 and 85, respectively.

Peru.—Four cases of plague were reported in Callao on May 7th; a telegram dated May 12th states that there has been no further extension of the disease.

Spleen.

CHRONISCHE TUMOR DER MILT ALS GEVOLG VON THROMBOSE DER VENA PORTÆ [Chronic Enlargement of the Spleen, the Result of Thrombosis of the Portal Vein], by A. J. van der Weyde and W. van Ijzeren. *Weekblad van het Nederl. Tijdschr. voor Geneeskunde*, 1903, Nos. 14 and 15.

BERICHT ÜBER EINE DURCH SCHUSSVERLETZUNG BEDINGTE SPLENEKTOMIE [Report of a Splenectomy after Gunshot Wound], by L. Brennfeck. *Munch. mediz. Wochenschr.*, 1903, No. 14.—The course of this case was favourable in spite of serious anæmia. No alteration in either the blood or in assimilation could be detected during the first four months after the accident, and there was no disturbance of other organs.

NOTICES.

THE Seventh Annual Medical, Surgical, and Hygienic Exhibition will be held at the Queen's Hall, Regent Street, London, from June 2nd to June 5th, inclusive. The Exhibition will be open daily from 1 p.m. to 10 p.m. Admission Free.

MR. JONATHAN HUTCHINSON'S Address on the Etiology of Leprosy will be delivered before the Epidemiological Society of London on May 26th, at 8 p.m.

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Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—JUNE 1, 1903.

Original Communications.

RESEARCHES ON THE ETIOLOGY OF SLEEPING SICKNESS.

By Dr. ALDO CASTELLANI.

THERE is much difference of opinion regarding the etiology of sleeping sickness, the disease having been considered a peculiar kind of malaria, a variety of beri-beri, a food intoxication, a form of sunstroke, &c. According to Le Dantec the disease is due to the *Anguillula intestinale*, according to Ferguson to the *Ankylostoma duodenale*. The best-known theory is that of Manson, who suggested that *Filaria perstans* might be the cause of the disease. There is no doubt that this theory had many points in its favour, especially as it explained the long incubation period of the disease, but the recent researches of Low and Christy tend to demonstrate that *Filaria perstans* cannot be the direct cause of sleeping sickness.

Many observers favour a bacterial origin, and the most different germs have been described as the cause of sleeping sickness.

Cagigal and Lepierre in 1897 announced that they had isolated a bacillus from the blood of a patient suffering from sleeping sickness, which when injected into animals was able to reproduce the disease; but these experiments were not confirmed later by Brault and Lapin. Next, Marchoux, basing his statements on the following observations, is of the opinion that sleeping sickness is due to Fränkel's diplococcus. At the *post-mortem* examination in a case of sleeping sickness where the patient was suffering also from pericarditis, he found Fränkel's diplococcus in the exudation of the pericardium. In a second case, complicated by chronic rhinitis and suppuration in the sinus frontalis, the secretion of the nose showed the same micro-organism. Besides these two observations, to which I do not think much importance can be attached, Marchoux was brought to his hypothesis by having noticed that sleeping sickness sometimes developed in people who had suffered from pneumonia. Lately there have been the bacteriological researches of the Portuguese Commission and those of Dr. Broeden. The Portuguese describe a diplo-streptococcus, which they state they have found constantly in the cerebro-spinal fluid at the *post-mortem* examination of their cases. They state that they have frequently found the same organism in patients during life in the cerebro-spinal fluid taken by lumbar puncture. According to their description, the characteristic feature of this germ is that it does not grow at all on gelatine and very poorly on the other usual culture-media.[1]

Dr. Broeden, Director of the Bacteriological Laboratory at Leopoldville, describes as the cause of the disease a bacillus which is slightly motile, producing a pellicle on bouillon and growing abundantly on potatoes. He was able to find the germ constantly in the blood of all his patients. The bacillus was not agglutinated by the blood of patients suffering from sleeping sickness.

PERSONAL RESEARCHES. RESULTS OF THE BACTERIOLOGICAL INVESTIGATION OF THIRTY-NINE NONCOMPLICATED CASES.

In non-complicated cases I have found frequently a variety of streptococcus which generally, although not quite constantly, shows some characters different from the typical *Streptococcus pyogenes*. Out of 39 cases, I have grown this variety of streptococcus from the blood of the heart in 32, and from the liquid of the lateral ventricles in 30. The germ does not seem to be present frequently in the organs. I have found it a few times in microscopical sections of the

[1] In a recent communication the members of the Portuguese Commission have greatly modified the description of their organism stating that it grows also on gelatine and on the other usual culture-media.

brain and the spleen. During life I have found the germ very rarely, and only in the last stages of the disease. From the blood taken from a vein I have grown it once only, although I have examined bacteriologically the blood of 37 patients, repeating the investigation several times and with different methods. I have examined the cerebro-spinal fluid obtained by lumbar puncture in 28 patients; in 5 I had positive results, but only a few hours before death, with the exception of one case, in which I found the streptococcus several days before death. In 6 bacteriological examinations of urine I grew the germ once; this was the same case as that in which I found it in the blood.

In 3 patients I punctured the spleen during life; the bacteriological examination of the spleen juice obtained in this way gave always negative results. The bacteriological examinations of enlarged lymphatic glands removed during life were negative.

Description of the Organism.—The microscopic appearance is very variable, depending on the different media on which the germ has been cultivated, &c., all transitions from long chains to typical diplococci being seen. The form and size of individuals are also, within certain limits, variable. Frequently about the chain and the diplococcus-forms well-defined mucoid capsules are seen, and in hanging-drop preparations the short chains and the diplococci-forms show a well-marked Brownian movement.

Staining Properties.—It is easily stained with the ordinary solutions of the different aniline dyes. Gram positive.

Cultivation—Gelatin.—Growth occurs very well on gelatin at a temperature of 22° C. and also much below. In a stab culture the stab is generally thread-shaped, although sometimes it may appear a little granular. The surface growth is very slight. In streak cultures the colonies may coalesce, forming a mass with a fine granular surface and sometimes wavy borders. In some very few cases after five or six days I have noticed a very slight liquefaction of the gelatin.

Agar.—In a stab culture growth takes place luxuriantly along the stab, the surface growth being generally more delicate. In streak cultures, in most cases the growth is very vigorous, the colonies not remaining separate, but coalescing into a whitish mass with granular surface and wavy borders. Still in rare cases—especially if the agar is old—the growth may be much more delicate and the colonies may remain separate. The water of condensation shows as a rule a slight whitish deposit.

Glycerin-agar.—The growth is the same as on agar, but rather more delicate.

Sugar-agar.—No gas formation.

Litmus-agar.—The colour of the medium does not change.

Potatoes.—Slight growth.

Bouillon.—The appearance of bouillon cultures varies greatly. In the majority of cases the bouillon remains clear and there is a flocculent and sometimes sandy sediment. In these cultures one generally finds long chains on microscopic examination. In some cases the bouillon is cloudy, with little or no sediment, and in cultures of such an appearance microscopical examination will often show the cocci arranged in pairs and in short chains. The same strain of germ will sometimes make the bouillon cloudy and sometimes not.

Serum.—There is good growth, but more delicate than in agar.

Milk.—There is generally no coagulation.

Relation to Oxygen.—The micro-organism is a facultative anaërobe.

Vitality.—According to my experiments, it is more resistant than other varieties of streptococci.

Virulence.—I have made very few experiments on the subject, as in Uganda it is impossible to find the usual laboratory animals, like rabbits, &c. In monkeys, ½ cc. of bouillon culture inoculated under the dura mater gives rise to a general septicæmia, the monkey dying in about two to three days.

The above description shows that the streptococcic infection found in sleeping sickness is due to a variety of streptococcus, generally somewhat different from the typical *Streptococcus pyogenes*, from which it is differentiated by the more vigorous growth on agar, by the tendency of its colonies to coalesce, and by the non-coagulation of milk.

Investigation for Protozoa. Presence of a Trypanosoma in the Cerebro-spinal Fluid of Cases of Sleeping Sickness during Life.

Since November, 1902, when I began to use a special technique for the examination of the cerebro-spinal fluid, I have frequently observed in it a trypanosoma. To obtain good results one must adopt the following technique: By means of lumbar puncture, one drains off at least 15 ccm. of the cerebro-spinal fluid. It is better to reject the first few ccm., as they are apt to contain blood. When the fluid comes away clear, 10 ccm. are collected and centrifuged for fifteen minutes. At the end of this time there is found at the bottom of the tube a slight deposit of whitish sediment, and in some cases also a minute trace of blood.

The liquid above the sediment is poured off and the sediment examined under a moderately low power of the microscope. As the trypanosomes are at first fairly active they are easily detected.

I have collected my experiments in the following tables:—

Table I.—Sleeping Sickness Cases.

No.	Name	Sex	Age	Date	Stage of Disease	Microscopic Appearance of Sediment	Presence of Trypanosoma in Cerebro-spinal Fluid
1	Mundo ..	M.	15	12,11,02	3rd	A few leucocytes, the majority of which are mononuclear; some very rare red blood corpuscles	Present.
2	Maoli ..	M.	18	25 11 02	3rd	Some few leucocytes and R.B.C.	Absent.
3	Aritzo ..	M.	25	7 12,02	3rd	Some leucocytes; no R.B.C.	Absent.

TABLE I.—SLEEPING SICKNESS CASES.—*Continued.*

No.	Name	Sex	Age	Date	Stage of Disease	Microscopic Appearance of Sediment	Presence of Trypanosoma in Cerebro-spinal Fluid
4	Manika[1] ..	F.	10	15 12 02	3rd	A few leucocytes; very few R.B.C.	Present.
5	Ialika ..	F.	22	15 12 02	2nd	A few leucocytes; very few R.B.C.	Absent.
6	Asmeni ..	F.	8	15 12 02	3rd	Some leucocytes and many R.B.C.	Absent.
7	Bolenti[2] ..	M.	10	22 12 02	3rd	Some leucocytes; no R.B.C.	Present.
8	Ally ..	M.	20	5/1/03	3rd	Few leucocytes and some R.B.C.	Absent.
9	Makassa ..	F.	25	25/1/03	3rd	Some leucocytes; no R.B.C.	Present.
10	Kaperi II.	M.	14	25/1/03	2nd	A few leucocytes and very few R.B.C.	Absent.
11	Ally II. ..	M.	30	2/2/03	3rd	Some leucocytes and R.B.C.	Absent.
12	Mocreza ..	M.	30	10/2/03	2nd	A few leucocytes and R.B.C.	Absent.
13	Budara ..	M.	22	27/2/03	2nd	Some leucocytes and very few R.B.C.	Present.
	,, ..	,,	,,	2/3/03	—	Some leucocytes and very few R.B.C.	Present.
14	Nombi ..	F.	30	27/2/03	1st	Few leucocytes and R.B.C.	Absent.
15	Fatoma ..	F.	18	27/2/03	2nd	Very scarce leucocytes and no R.B.C.	Absent.
	,, ..	,,	,,	1/4/03	—	Some leucocytes and a few R.B.C.	Present.
16	Zenabu ..	F.	22	24/3/03	1st	No R.B.C. ..	Absent.
17	Benjamin	M.	20	25/3/03	2nd	—	Absent.
18	Zakibu ..	M.	25	25/3/03	2nd	Few leucocytes and R.B.C.	Present.
	,,	,,	,,	27/3/03	2nd	Few leucocytes and R.B.C.	Present.
19	Seera ..	M.	25	26/3/03	2nd	—	Present.
20	Kimbra ..	M.	55	26/3/03	3rd	Some leucocytes; no R.B.C.	Present.
21	Abdulla ..	M.	—	26/3/03	—	No R.B.C.	Present.
22	Kagoya ..	F.	20	26/3/03	3rd	No R.B.C.	Present.
23	Keogaffum	M.	55	27/3/03	2nd	Some leucocytes; no R.B.C.	Absent.
	,,	,,	,,	1/4/03	—	—	Absent.
24	Jacobo[3] ..	M.	20	28/3/03	3rd	Some leucocytes; no R.B.C.	Present.
25	Iegobaza ..	M.	40	27/3/03	2nd	Few leucocytes; no R.B.C.	Present.
26	Ibsarara ..	F.	35	27/3/03	3rd	Some leucocytes; no R.B.C.	Present.
27	Leobeni ..	M.	25	28/3/03	2nd	No R.B.C.	Present.
28	Kidorme ..	M.	20	28/3/03	2nd	Some leucocytes and R.B.C.	Present.
29	Keagabidoia	M.	55	28/3/03	3rd	Some leucocytes and R.B.C.	Absent.
	,,	,,	,,	1/4/03	3rd	Some leucocytes and R.B.C.	Absent.
30	Kitar[illegible]ma[4]	M.	25	28/3/03	2nd	Some leucocytes and R.B.C.	Absent.
	,,	,,	,,	2/4/03	2nd	Some leucocytes and R.B.C.	Absent.
31	Waiswa ..	M.	10	29/3/03	2nd	Some leucocytes and R.B.C.	Present.
32	Kaperi I.[5]	M.	8	23/3/03	3rd	No R.B.C.	Present.
33	Matasa ..	M.	28	29/3/03	2nd	Few leucocytes and R.B.C.	Absent.
	,,	,,	,,	2/4/03	2nd	Few leucocytes and R.B.C.	Absent.
34	Decodeno	M.	25	31/3/03	2nd	Few leucocytes and R.B.C.	Present.

[1] Patient died on December 18th, 1902. No complications. In fluid from lat. vent. tryp. present.

[2] In fresh preparations of blood taken from a finger the same day I found a few trypanosomes apparently similar to those found in the lumbar puncture liquid.

[3] The trypanosomes were much more numerous than in other cases.

[4] Only 5 c.c. of liquid collected.

[5] Trypanosoma present also in the fluid taken from lateral vent. at the *post mortem*.

TABLE II.—CONTROLS.

No.	Name	Sex	Age	Date	Disease	Microscopic Appearance of Sediment	Presence of Trypanosoma in Cerebro-spinal Fluid.
1	Doanira	M.	35	11/1/03	Chronic nephritis	Very few leucocytes and R.B.C.	Absent.
2	Kano Buringo[6]	M.	30	24/3/03	Trypanosoma fever	Very few leucocytes and R.B.C.	Absent.
3	Landu ..	M.	—	24/3/03	Enlargement of femoral glands	Few leucocytes; no R.B.C.	Absent.
4	Kamsuro[7]	M.	—	28/3/03	Trypanosoma fever	Few leucocytes and R.B.C.	Absent.
5	Zake ..	M.	25	30/3/03	Cellulitis	Few leucocytes: no R.B.C.	Absent.
6	Scongo ..	—	—	30/3/03	Itch ..	Very few leucocytes and R.B.C.	Absent
7	Pio ..	M.	12	30/3/03	—	Very few leucocytes and R.B.C.	Absent.
8	Kaperi III.	M.	25	30/3/03	Itch ..	Very few leucocytes and R.B.C.	Absent.
9	Eliza ..	F.	18	30/3/03	Yaws ..	Very few leucocytes and R.B.C.	Absent.
10	Bofralour	M.	16	31/3/03	Pleuritis	Very few leucocytes and R.B.C.	Absent.
11	Zanabu II.	F.	30	31/3/03	Headache	Very few leucocytes and R.B.C.	Absent.
12	Murjan Jordien[8]	M.	35	31/3/03	Trypanosoma fever	Very few leucocytes and R.B.C.	Absent.

[6] Dr. Baker found *Trypanosoma Gambiense* in blood some days ago.

[7] Dr. Baker found *Trypanosoma Gambiense* in blood the same morning.

[8] Dr. Baker found *Trypanosoma Gambiense* in blood the same morning.

Table I. shows that in 34 cases of sleeping sickness the trypanosomes were found in the cerebro-spinal fluid taken by lumbar puncture during life in 20 cases, giving a rate of 70 per cent.

On two occasions I also examined in the same way fluid obtained *post mortem* from the lateral ventricles, and in both cases found the same parasite. In the blood among the few cases tested for this purpose I found the trpyanosome once with certainty. In the blood I have observed several times large roundish bodies which I shall describe later on, and which I think might be considered developmental stages of the trypanosome. The same bodies I have found frequently also in the cerebro-spinal fluid. It might be thought that the trypanosomes are found in the cerebro-spinal fluid on account of the trace of blood which sometimes forms part of the sediment, but in several cases there were no traces of blood.

Table II. shows that in 12 cases of ordinary disease the cerebro-spinal fluid taken during life by lumbar puncture in no case contained trypanosoma, and it is important to note that 3 of these controls were cases of the usual trypanosoma fever as described by Forde, Dutton, Manson, Daniels, &c. Dr. Baker will soon publish these three interesting cases of trypanosoma fever. It must be clearly understood that these cases of trypanosoma fever bear no resemblance in their clinical features to sleeping sickness.

Description of the Parasite.

Fresh Preparations.—The parasite has the usual general outline of the other trypanosomes. It has a worm-like shape, and one observes in it one end terminating with a flagellum, the other more or less bluntly conical, an undulating membrane and a vacuole. The protoplasm does not appear to have quite a uniform structure, but rather an alveolar one as described by Bradford and Plimmer in *Trypanosoma Brucei*, although apparently far from being so well marked. At first the parasite moves fairly actively in a screw-like fashion as described in the other species of trypanosomes. On observing the preparation for some time with the microscope one sees that the movements by-and-by become more sluggish, until they stop altogether. Frequently the trypanosome stops near a leucocyte which by degrees engulfs it. On several occasions I have observed trypanosomes with apparently two well-marked flagella; the parasites were possibly in a stage of longitudinal division.

Stained Specimens.—For staining the parasite Leishman's modification of the Romanowsky's method gives very good results. Staining the trypanosome in this way, the macro-nucleus, micro-nucleus and flagellum appear red, the protoplasm blue, while the undulant membrane remains almost unstained.

The nucleus is generally large and of variable shape. It is as a rule situated in the posterior half of the parasite.

The *micro-nucleus* (Plimmer and Bradford), or centrosoma (Laveran et Mesnil), does not show apparently any structure. It stains red, but of a much more vivid colour than the nucleus. It is situated very near the posterior end of the parasite and generally outside the vacuole.

The *vacuole* is oval and of rather large dimensions. It is situated anterior to the micro-nucleus.

The *flagellum* takes origin apparently from the micro-nucleus, then following the external edge of the undulating membrane reaches the anterior extremity, where it becomes free. The free portion of the flagellum is usually longer than in *Trypanosoma Gambiense*.

The *protoplasm* does not stain evenly and not very deeply; it does not show many chromatic granules.

The total length of the parasite is from 18 to 26 μ. The width is from 2 to 2·5 μ.

Non-Adult Forms of the Parasite. Amœboid Forms (?).

In the blood taken from the finger, especially during the last stages of the disease, in the blood of the heart, as well as in the cerebro-spinal fluid, I have seen frequently large roundish bodies of 12-16 μ in diameter with one or more vacuoles, which on a superficial observation might be taken for amœbæ if it had not been that they did not emit pseudopoda. These bodies, stained by the Romanowsky-Leishman method, show two or more points where the chromatin collects. I am inclined to consider these bodies as developmental stages of the trypanosome, something like the *amœboid forms* so well described by Plimmer and Bradford in *Trypanosoma Brucei*.

Identification of the Parasite.

The only species of trypanosoma so far known in man is *Trypanosoma Gambiense* (Dutton). Though others may have seen it before (Nepveu, Forde) there is no doubt that Dutton was the first observer to describe it scientifically. Dutton and Forde were the first to draw attention to its relation with a specific fever which principally attacks Europeans in the Tropics. This species of trypanosome has been found up till now in the blood only.

As regards general shape and size the *Trypanosoma Gambiense* and the one I have found in sleeping sickness do not differ much, but according to my experience differences may exist in the position of the micro-nucleus, the vacuole and the flagellum. In the trypanosome of sleeping sickness the micro-nucleus is generally much nearer the extremity, and as a rule outside the vacuole; the vacuole is generally larger. The flagellum takes origin apparently from the micro-nucleus; the free portion of the flagellum is longer. One can see these morphological differences, which I would insist are frequent though far from being constant, in the accompanying drawings and plates. Although I have not yet performed inoculation experiments in the lower animals, I am inclined to think that it may possibly turn out to be a new species. I am supported in this hypothesis by a recent communication by Kruse to the Medical Society of Bonn.[1] I do not see any reason why man should not be attacked by different species of trypanosoma, each of which might give

[1] *Ueber das Trypanosoma Castellanii den Erreger des Schlafkrankheit, Sitzungsberichten der Niederrhein. Gesellsch. f. Natur. und Heilkunde zu Bonn, Mai,* 1903.

rise to a different disease. This fact has been clearly demonstrated in the lower animals. The horse, for instance, is liable to be infected by three different species of trypanosoma: *Trypanosoma Brucei*, the cause of nagana; *Trypanosoma Evansi*, the cause of surra; *Trypanosoma equiperdum* (Döflein), the cause of the disease called "dourine."

Some observers have tried to identify *Trypanosoma Brucei* with *Trypanosoma Evansi*, but the last studies have clearly proved that they must be considered two different species.

Trypanosoma found in Sleeping Sickness.

Trypanosoma Gambiense (Dutton).

Conclusions.

To condense the results of my whole investigation into a few words, I can state that —

(1) In a large percentage (70 per cent.) of cases of sleeping sickness, I have found in the cerebro-spinal fluid taken by lumbar puncture during life a trypanosome which may possibly represent a new species.

This trypanosome may be found also in the blood of the patients, where I actually found it as far back as December, 1902, as one can see from the tables appended to my preliminary note. The greater difficulty to find it in the blood is probably due to the fact that one cannot apply so easily to the blood the technique I have used for the cerebro-spinal fluid. The new method recently introduced by Ross for malarial parasites will probably give very good results.

In the blood as well as in the cerebro-spinal fluid I have found special bodies which I am inclined to consider developmental stages of the trypanosome, something like the amœboid and plasmodial forms described by Plimmer and Bradford in the *Trypanosoma Brucei.*

The trypanosome, according to my experience, is never found in the cerebro-spinal fluid of other diseases outside sleeping sickness.

(2) At the *post-mortem* examination of 80 per cent. of the cases I have cultivated from the blood of the heart, and the liquid of the lateral ventricles, a variety of streptococcus which frequently shows cultural characters somewhat different from the typical *Streptococcus pyogenes.* This streptococcus I have found very rarely during life, and even then, as a rule, *in extremis.*

The question arises, what part have the two organisms in the etiology of the disease? In the first stage of my investigation I attached much importance to the streptococcus, but at that time I had not found the trypanosoma, and this is easily explained by the fact that I did not use the technique I have described in this paper.

The fact that the trypanosoma I have described is found in the cerebro-spinal fluid of sleeping sickness patients in 70 per cent. during life and, so far as my experience goes, never in the cerebro-spinal fluid of other diseases, is, I think, very suggestive and points to something more than a mere coincidence. Probably in sleeping sickness, as occurs in other diseases, there may be, at least in the last stages, a concomitant streptococcus infection. In scarlet fever, for instance, and rheumatic polyarthritis are often found varieties of streptococcus different from the typical *Streptococcus pyogenes*, and for these varieties the blood of the patients shows agglutination; still most likely these streptococci, although they must certainly play an important *rôle*, are not the primary cause of those diseases.

From the whole of my researches I am inclined to come to the conclusion that sleeping sickness is probably due to the trypanosoma I have described. At the same time, in the last stages there is frequently a concomitant streptococcic infection which must play a certain part in the course of the disease

Literature.

Brault et Lapin, *Archives de Parasitologie*, 1898, No. 3.
Broeden, *Academie Royale de Medicine de Belgique*, 1901.
Cagigal et Lapierre, *Coimbra Medica*, 1897, quoted by Scheube, *Die Krankheiten der warmen Länder*, p. 565.
Castellani, *Brit. Med. Journ.*, May 23rd, 1903, and *Proceedings of the Royal Society*, May 8th, 1903.
Cook, Journal of Tropical Medicine, 1902.
Dutton, *Thompson Yates Laboratories Report*, 1902.
Ferguson, *Brit. Med. Journ.*, 1899.
Forde, Journal of Tropical Medicine, 1902.
Hodges, Journal of Tropical Medicine, 1902.
Kruse, *Sitzungsberichten der Niederrhein. Gesellsch. f. Natur. Heilkunde*, 1903.
Laveran et Mesnil, *Ann. Inst. Pasteur*, 1902.
Le Dantec, *Arch. Clin. de Bordeaux*, 1898.
Low, *Brit. Med. Journ.*, 1903.
Manson, "Tropical Diseases," 1903.
Marchoux, *Ann. Inst. Pasteur*, 1899, No. 3.
Moffatt, *Medical Reports Uganda Protectorate*, 1902.
Nepveu, *Memoires Soc. de Biologie*, 1891; *Memoires Soc. de Biologie*, 1898.
Plimmer and Bradford, *Quart. Journ. of Micr. Sc.*, vol. xlv., part 3, February, 1902.
Wiggins, *Brit. Med. Journ.*, 1903.
Ziemann, *Centr. f. Bakt.*, 1902.

TROPICAL HYGIENE.

By W. J. Simpson, M.D., F.R.C.P.

Lecture III.—*Continued.*

Water Supplies.

(*Continued from p.* 160.)

The following is a description by the manufacturers of the Forbes Water Steriliser, which is in two types for domestic or household use :—

"Type No. 1 is entirely independent of the plumbing in the house. It is portable and is intended for use in the country where the water supply is from a pump or well, or in any place where the water supply is not at hand in pipes. Its use consists in filling a bottle holding several gallons and placing it on the apparatus which automatically sterilises and transfers the water into another bottle of like size.

"Type No. 2 is intended for connection with the water supply pipe of a house, and may be connected by a rubber tube or permanently connected by a plumber. It automatically sterilises the water and discharges it into a suitable receptacle, and its operation is continuous so long as the flame of burner is kept lighted.

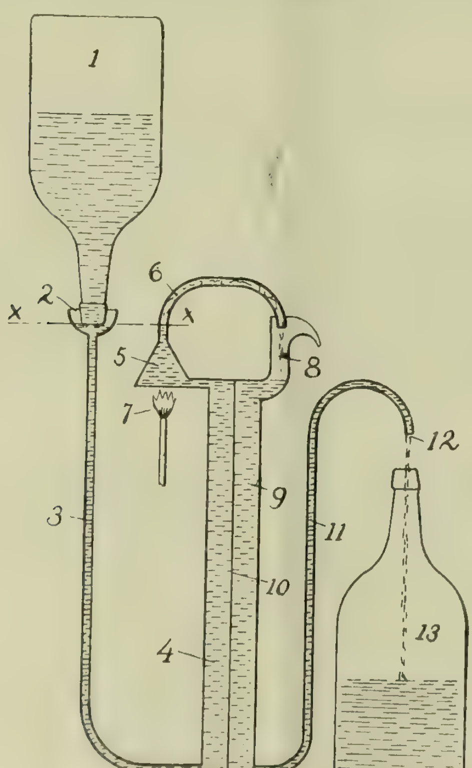


FIG. 1.
Principle of Operation.

"Figure 1 is a purely diagrammatic view of the No. 1 or aerostatic feed apparatus, and serves to explain the method of operation.

"The raw or unsterilised water is supplied from the inverted bottle 1. The water runs from the bottle 1 into the cup 2, then down through the pipe 3 into the compartment 4 of the heat exchange, which it fills. When compartment 4 is filled the water runs into the heater 5 and rises in the pipe 6 to the level X, where it stops. No more water will now run out of the bottle 1, because its mouth is sealed by the water in the cup 2 at the level X. The burner 7 is now lighted and heat is applied under the heater 5, which causes the water in the heater to boil, and in boiling it rises in the pipe 6 and flows over into cup 8, just as a pot on a cooking range will boil over. It is therefore impossible for any water to pass through the apparatus until it has boiled, for it is only by boiling that it can rise sufficiently in the pipe 6 to flow over into the cup 8. This boiling lasts for but the fraction of a second, and once the water has passed through the pipe 6 it is removed from where heat can again reach it. When some water has boiled over, as above stated, the level of the water in the heater 5 and likewise the level of that in the cup 2 is lowered. This exposes the mouth of the bottle 1, so that a small quantity of air enters the bottle and allows a corresponding quantity of water to run out of the bottle and refill the cup 2 and heater 5 up to the level X again, when the mouth of the bottle is again sealed by the water, and no more water can run out of it until the level is again lowered by reason of more water boiling over through the pipe 6.

"This action becomes continuous, for the flame 7 is constantly boiling the water in the heater 5 and causing it to flow over through the pipe 6. The water continues to boil over into the cup 8 and quickly fills compartment 9 of the heat exchange. When compartment 9 is filled the water runs out of the pipe 11 at the opening 12 into the receiving bottle 13. While passing down through the compartment 7 the heat of the water, which is boiling hot, is transferred, by conduction, through the thin metal partition or diaphragm 10 to the cold water passing up through compartment 4, so that the water which is boiled in the heater 5 passes out of the apparatus nearly as cold as that entering, while the cold water entering the apparatus becomes heated as it passes up through the compartment 4, and reaches the heater 5 in a very hot condition and nearly at the boiling point.

"Therefore the only heat which has to be supplied to keep the apparatus running continuously is that necessary to bring the already highly heated water entering the heater 5 to the boiling point, and cause it to rise above the normal water level X and boil over through the pipe 6, and so pass on through the remainder of the apparatus to the discharge outlet 12.

"Fig. 2 is a diagrammatic view of the No. 2 apparatus. The principle of operation of this apparatus is identical with that of the No. 1 apparatus, but the construction is slightly different. In the No. 2 apparatus 1 shows a water tank with a pipe 2, through which water enters and is allowed to fill the tank up to the water level X, but no higher, as it is restrained by the float-actuated valve shown in the tank.

"The small tank with the float and valve merely takes the place of the inverted bottle and aerostatic feed used in the No. 1 apparatus. Both the aerostatic device and the float and valve have the same functions, viz., maintaining the water-level at the line X. In the No. 2

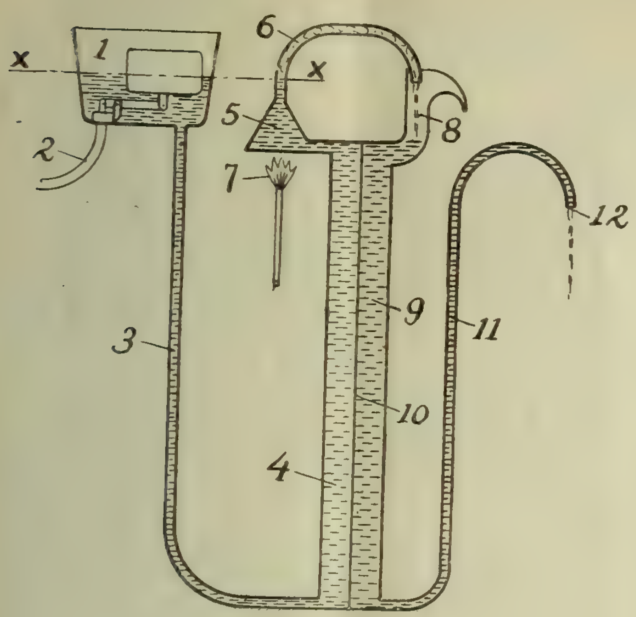
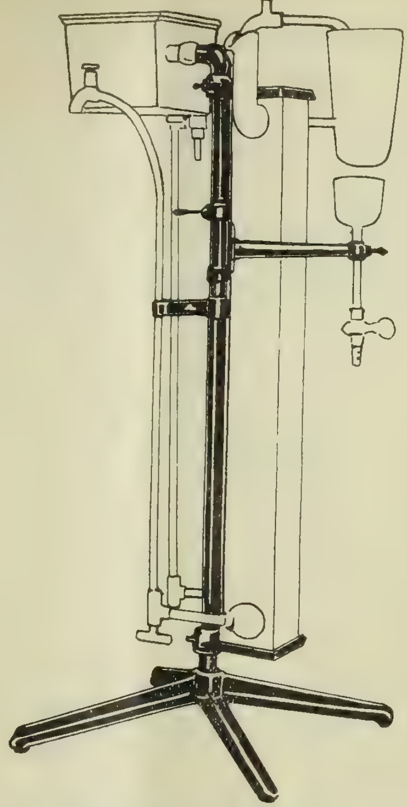
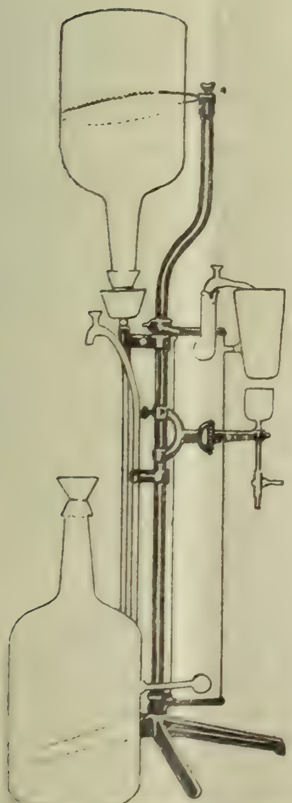


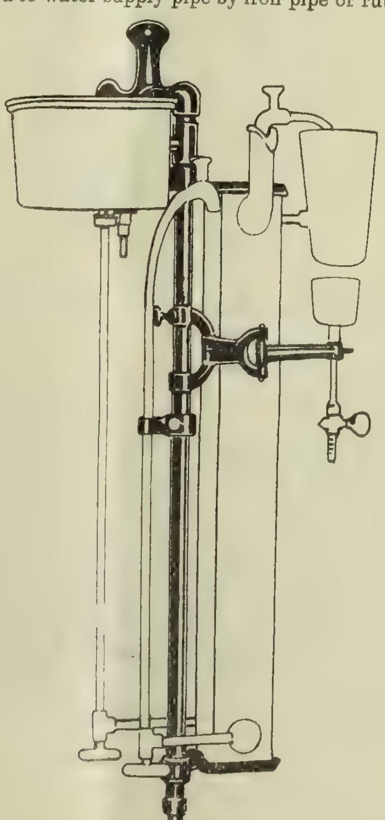
FIG. 2.



No. 2 Apparatus.—For use on floor, counter or shelf. Can be connected to water supply pipe by iron pipe or rubber tubing.



No. 1 Apparatus.—Portable. For use with bottles where water supply is not at hand in pipe.



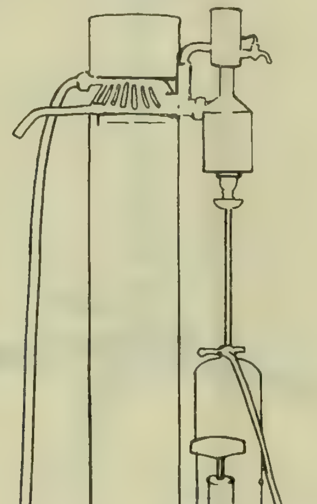
No. 3 Apparatus.—Same as No. 2 Apparatus, but with bracket for hanging on the wall.

apparatus the pipe 2 is connected with a constant water supply, such as a faucet or the water supply pipe of the house.

"After the water leaves the float box it runs down through the pipe 3, and the action of the apparatus from this point on is exactly like that of the No. 1 apparatus before described."

The accompanying reproductions from photographs show the two types in modified form to suit various situations.

There is still another type, the Army type, adapted for sterilisation of water for troops in the field.



No. 4 Apparatus.—Forbes Water Steriliser (Army type for kerosene).

The capacity of this apparatus is such as to sterilise 25 gallons of water an hour, with a difference in temperature between the inflowing and outflowing water of 12° F. The consumption of kerosene oil (when operated by kerosene) is 1 quart in from four to five hours, according to the intensity of flame. The capacity of oil tank is 1·37 gallons; the net weight of steriliser complete, 64 lb.; the weight of steriliser complete in field case, with all spare parts, 112 lb.; the weight of field case empty, 44½ lb. The outside dimensions of this box are: 47½ in. long, 13¾ in. wide, 12¾ in. high. The steriliser is constructed entirely of sheet copper, with brass castings and brass tubes, all block tin lined and nickel-plated and polished on the outside.

THE PANAMA CANAL AND THE INTRODUCTION OF YELLOW FEVER INTO ASIA.

By St. George Gray, B.A., M.B., B.Ch. Univ. Dub.
Medical Officer, Sierra Leone; Colonial Medical Service.

As the completion of the Panama Canal within a reasonable time by the United States Government becomes more and more probable, the possibility of the introduction of yellow fever into Asia becomes a real danger, and it is the imperative duty of all the civilised nations having interests in the Far East to ward off this danger by every means known to science, and no question of expense or personal interests should be allowed in any way to obstruct such measures as may be deemed necessary for the efficient protection of the threatened Asiatic ports.

Dr. Manson has called attention to this danger in his paper read before the meeting of the Epidemiological Society on February 25th. He pointed out that shiploads of labourers would soon be plying between Panama and the seaports of Asia, and that if the traffic were unrestricted the disease would inevitably be introduced into the populous, densely crowded, and insanitary cities of China and India, where its ravages would be incomparably greater than they could be in the sparsely peopled countries and smaller cities of South America.

Yellow fever is carried from the sick to the healthy by the bites of mosquitoes, and by the bites of mosquitoes only, and not by fomites as was formerly supposed. This has been proven beyond a doubt by the United States Army Medical Board at Quemados in Cuba, at the head of which was the late Major Walter Reed. This commission inoculated thirteen non-immunes with yellow fever by causing them to be bitten by infected mosquitoes. These results were afterwards confirmed by Professor John Guiteras, of the University of Havana, at Las Animas Hospital, where he succeeded in inoculating eight non-immunes with yellow fever by the bites of infected mosquitoes. So successful, indeed, was he in producing yellow fever in this manner that three of the experimental cases terminated fatally.

The mosquito which carries yellow fever—*Stegomyia fasciata*, is the commonest of all mosquitoes in the West Indies, and probably in most tropical and subtropical countries, for it is almost world-wide in its distribution. But it is not every *Stegomyia* that is dangerous. For a mosquito to become infectious it must bite a person suffering from yellow fever in a certain stage of the disease, and then the germ must remain for a time within the body of the mosquito, where it undergoes certain changes of development before the disease can be communicated to another individual. "So far as we may conclude from the small number of experiments made," says Dr. Guiteras, "it appears that an insect, to become infected, must bite the patient on the first, the second, or the third day of the disease. . . . A mosquito so infected cannot communicate the disease until a period of more than twelve days has passed since the insect became infected. . . . Twelve days is the minimum, but higher figures, such as seventeen days, are more

common."[1] It is on record that a mosquito has bitten a non-immune, and produced yellow fever on the fifty-ninth day from its infection;[2] and it is probable that a mosquito, once infected, remains infective for the rest of its life, and capable of infecting a number of individuals, limited only by the number of meals of blood the insect can take. At any rate it is not known that an infected mosquito ever becomes free of infection and therefore non-infective once more. Mosquitoes are not the short-lived creatures they were once supposed to be, partaking of a single meal of blood, and dying after laying a single batch of eggs, to become food for their voracious offspring in the larval state. I have kept *Stegomyia fasciata* alive in a gauze cage for three months, during which time the females have partaken of several meals of blood—as well as of sugar and banana—and have laid several batches of eggs on the surface of the water provided for them. How much longer they might have lived I do not know, for I killed them all, as I required the cage for another purpose.

The period of incubation of yellow fever has been ascertained to be from three to six days. In the experimental cases at Las Animas Hospital the shortest time in which yellow fever developed after the subject had been bitten by infected mosquitoes was three days, and the longest five days and twenty-one hours—practically six days. For purposes of quarantine, therefore, the period of incubation may be fixed at seven days or under.

The quarantine regulations against yellow fever that have been in force in the West Indies up to the present time have been unnecessarily strict in some particulars, and at the same time inefficient and often exceedingly lax in others.

The period of incubation for yellow fever has been fixed throughout the West Indies at fourteen days, and no vessel is admitted to *pratique* less than fourteen days after having had communication with an infected port. Mails and cargo are fumigated with sulphur, generally in lighters after having been removed from the ship, and passengers are sent to the quarantine station, or if there is none, they are put on board some vessel hired for the occasion, until the fourteen days have expired. As often as not this vessel is a wretched little sloop or open lighter, without any awning or other shelter from the blazing sun or heavy tropical rains. The unfortunate passengers have to provide themselves with food at their own expense. It may be sent to them from the shore, but all dishes, cutlery, &c., must be kept on board, or at the station, until they are released from quarantine. This is an unnecessary hardship, and not infrequently the passengers suffer severely from the effects of the exposure they have undergone. I have known of a woman who had to spend a few weeks in hospital to recover from her sojourn in the quarantine vessel.

On the other hand, the quarantine regulations are inefficient because no precautions whatever are taken to keep mosquitoes—infected or otherwise—which may have been on board the quarantine vessel, from flying ashore.

In St. Lucia and St. Thomas, the two most important coaling stations in the direct route between Europe and the Isthmus of Panama (except Jamaica), there is a custom, against which I have always protested, which in my opinion renders quarantine a useless farce. This is permitting steamers to "coal in quarantine," as it is called, alongside the wharf. I do not know whether this is allowed in Jamaica, but I believe that it is.

When a steamer "coals in quarantine" it comes alongside the wharf, a portion of which (where the vessel lies) is enclosed by a rope, and guarded by a policeman, whose duty it is to prevent the public coming inside the enclosure. The coal-carriers, mostly women, carry their baskets on board just as if the ship were not in quarantine, only they are not supposed to have any communication with the crew.

It is not impossible that mosquitoes may come on board a steamer at an infected port and conceal themselves either in the cabins, among the clothing of the passengers and crew, or in the hold, where they might remain until the vessel arrives at a coaling station. Being disturbed by the bustle of coming alongside the wharf and by the noise of coaling the ship, they may fly ashore. Should any of these mosquitoes be infected and bite a non-immune, fever may result which is probably diagnosed as "bilious remittent." About three or four weeks later two or three similar cases occur—very likely among the friends of the last patient—and then others, until at last the people are obliged to acknowledge the disagreeable fact, that in spite of all their "stringent quarantine regulations," and "modern (?) methods of sanitation," they have yellow fever in their midst, and they wonder where it could have come from. Meanwhile, "coaling in quarantine" goes on as merrily as before, and I am afraid it will go on as long as coal merchants form an influential section of West Indian Quarantine Boards.

Sanitary measures to prevent the introduction of yellow fever into Asia from the Isthmus of Panama may be divided into (*a*) measures to be adopted at the point of departure—*i.e.*, at the central American port—and (*b*) measures to be adopted at the port of arrival—the Asiatic port.

(*a*) In the first place an International Sanitary Board should be permanently stationed on the Isthmus. The members of this Board would be appointed by the different governments having interests in the Far East, and they should be specially qualified for the work. They should have powers to frame such quarantine or other regulations as may be deemed necessary, and to enforce these regulations by means of penalties which should be sufficiently heavy to ensure their being carried out by the most careless and indifferent of captains.

The Sanitary Board should make sure that no vessel that has not been thoroughly cleared of mosquitoes leaves the Isthmus for any Asiatic port. The final clearing of mosquitoes or fumigation should take place at an anchorage to be selected for the purpose at least three hundred yards away from the nearest shore—

[1] *American Medicine*, November, 23rd, 1901.

[2] Lieut.-Col. V. Havard, U.S.A., "The Transmission and Prevention of Yellow Fever," International Sanitary Congress Havana, February 16th, 1902.

a mile would be better—and once the fumigation is completed the vessel should not approach the shore again, but passengers, mails and cargo from open lighters could be received on board.

As a further precaution I venture to suggest that any vessel sailing from an infected Central American port other than Panama for an Asiatic port should be obliged to call at the fumigating station at Panama, to be cleared of mosquitoes before proceeding on her trans-Pacific voyage. This may seem to be an unnecessary procedure, but the ordinary Central American official is too careless an individual to be trusted, and if the work were left to the local authorities it would certainly *not* be efficiently performed. Fortunately, the danger from this source is not great, but still it is there and should not be lost sight of. I have visited many of the Central American ports on the Pacific coast, and have observed that at only one of them, at Acapulco in Mexico, does the ship come at all close to the shore. At the others the steamers lie so far out, that although it may be possible, it is not at all likely that mosquitoes would fly on board from the shore. Acapulco, on the other hand, has a land-locked harbour with a narrow entrance, so that all vessels coming into the port must come quite close to the shore, and it is not at all difficult for mosquitoes to get on board.

Of course the most efficient method of preventing the spread of yellow fever to Asia from Panama as a focus would be to stamp out the disease from the Isthmus, as it has been done in Havana by the Americans under General Leonard Wood as Governor, and Major W. C. Gorgas as Chief Sanitary Officer.

This would be a costly procedure, but *it can be done*, and its accomplishment would well repay the cost. Panama is by no means so large a city as Havana, and Colon is still smaller, and I do not think that the expense of clearing the Isthmus of yellow fever would be anything like as great as was the expense of stamping it out of Havana. The smaller towns and villages along the route of the canal and railway would give relatively very little trouble.

Let each nation contribute its share of the cost in proportion to the magnitude of its interests in the East and drive yellow fever out of the Isthmus of Panama—then there would be no fear of its being carried to Asia by vessels passing through the Canal. The methods which were adopted to stamp out yellow fever have been fully described by Major Gorgas in the Havana Monthly Reports of Vital Statistics for 1901, and in an article on, "The Work of the Sanitary Department of Havana; with Special Reference to the Repression of Yellow Fever."[1]

(*b*) Should a vessel arrive at an Asiatic port not having been cleared of mosquitoes before leaving the Isthmus, such vessel should not be allowed to come within a mile of the nearest shore, but should anchor at a specified berth, where it could be fumigated before being allowed to come nearer; but passengers could be landed and cargo discharged into open lighters without any danger of communicating yellow fever.

Those ports in which a vessel can come alongside a wharf or jetty are in the greatest danger of becoming infected, because mosquitoes can more readily reach the shore from the ship than when it is obliged to anchor in the harbour or roadstead so that they have a longer distance to fly.

If we could be certain that no mosquitoes were on board any ship leaving Central America, there would be no danger of introducing yellow fever into Asia, even if the disease were to break out on board after leaving port, because the patient would have passed the period of the disease during which he would have been dangerous to others, and therefore would be harmless long before arrival at any Asiatic port. At the end of a voyage of three weeks or longer the patient would be either dead or convalescent, and mosquitoes could then feed upon his blood *ad libitum*, without the slightest risk of becoming infected.

The failure of the French Company to complete the canal should be regarded as one of those blessings in disguise, which, though looked upon as something very like a disaster at the time, are really better in the end than apparent success. Had the Panama Canal or its rival in Nicaragua been completed and in operation before the discovery of the United States Army Commission in Cuba, yellow fever would certainly in time have reached China and India, where it would no doubt spread with appalling rapidity, and become a formidable rival of the plague and cholera in keeping down the surplus population in those countries.

Now that we know how yellow fever is spread no time should be lost in getting it under control on the Isthmus, and the sooner work is commenced the better for the protection of Asia from this most treacherous disease.

[1] *New York Medical Record*, September 7th, 1901.

A CASE OF ACUTE DYSENTERY IN WHICH DEATH OCCURRED FROM ACUTE CARDIAC DILATATION, PROBABLY DUE TO CHRONIC PHENACETIN POISONING.

By A. T. White, M.R.C.S.Eng., L.R.C.P.Lond.

Late M.O. Uganda Protectorate, and late P.M.O. Assouan Dam Works Hospital.

A. B., aged about 30 years, Government official, arrived at the Ravine Fort in the Uganda Protectorate on March 23rd, 1899, from a station up country, in dry weather.

On March 24th he was taken ill with slight fever and some looseness of the bowels, and was treated by the Station doctor for malaria. During the day the looseness became greater, and in the evening I was called to see him in the absence of the Station doctor on duty beyond the fort.

I found the patient in bed, very depressed and miserable. There were no marked physical signs in his chest, and beyond being a sallow, pasty person there was nothing particularly noticeable about him. He had been given a 30-grain dose of ipecacuanha during the day with the routine mustard leaf and preliminary laudanum. The ipecacuanha had been promptly vomited and there had been vomiting ever since. There was a good deal of blood in the stools

and much mucus. Colic considerable, tenesmus not marked. I gave him $\frac{1}{4}$ grain morphia hypodermically and 1 drachm of powdered ipecacuanha in a bolus.

Next morning, March 25th, there was still some blood. There had been three stools, but he had only retained the ipecacunaha for an hour. He had slept and felt rather better.

March 26.—After a bad night, owing to his vomiting, he was still very depressed. Colic and tenesmus much less; blood and mucus less. Is taking powdered cinnamon and enemata of starch and opium, as he has refused any more ipecacuanha.

March 28.—In the absence of the Station doctor I saw the case again. He was very miserable and lachrymose, and I found that there had been great trouble in getting him to take food or medicine. He was in a very emotional state and his pulse was small and soft, and for the first time a little irregular. Treatment: champagne and cinnamon.

March 29.—The dysentery is much better, but the Station doctor tells me that his mental condition remains the same, and that the difficulty of getting him to take food remains and that he refuses the champagne. During the night I was called several times, as the patient was giving alarm owing to his weak and rapid pulse. He is very restless, constantly crying and saying he will die. He was given $\frac{1}{60}$ grain strychnine and $\frac{1}{6}$ grain morphia and champagne every half hour.

March 30.—He is much the same, acutely depressed and tearful, but says he has nothing to worry him except his personal condition. Thinks he will die. Heart apex is outside the nipple; action irregular and intermittent. Loud blowing murmur over pulmonary area. Has about three mucous stools in the day, but no colic. Temperature normal. Injections of $\frac{1}{60}$ grain strychnine every four hours, quinine and champagne by the mouth and milk and Brand's essence. Also enema of ipecacuanha daily.

March 31.—In the absence of the Station doctor I saw him again. Still depressed; is worried with some colic and flatus. No mucus in stool, which is fæcal and formed. He was easier and pulse 120, but stronger and less irregular. During the night I saw him several times as the Station doctor was himself ill with dysentery. He is much worse. Pulse 140 and very irregular. He is very restless, crying all night. No stools. Is getting champagne and Brand's essence every hour. Digitalis and ammonia by the mouth.

April 1.—He was steadily going down hill. The heart apex is nearly out to the axilla. Pulse 120, feeble, irregular. Will only take food after great coaxing. His condition remained the same during the day; he is very restless and cries all the time. Treatment: strychnine injection every four hours and champagne, milk and Brand's essence when possible. During the evening he became unconscious. A "typhoid condition" set in, with involuntary passing of urine, &c. No stools. Loud blowing murmur all over chest.

April 2.—Pulse hardly perceptible. He died quietly at midday.

Previous History.—The previous history of the case had been shortly this: He had at the time of the onset of his illness only returned two months before from leave in England, whither he had gone to recruit after the end of the Soudanese revolt. Before he went on leave he had had a good deal of fever up country, and owing to the nature of the duties and hardships which fell to the lot of all the Government officials during this time he had been a good deal exposed. Consequently he was in very poor health when he went on leave. During his leave he married, but owing to the exigencies of the service left his wife in England on his return to Uganda. Moreover, when he reached the coast on his way out, he received the news of the death of a near relative, and there is no doubt that when he left the coast he was in poor health and worried about his affairs, and during the two months' journey up he had been on and off suffering from slight fever. On the advice of a brother official who had unfortunately been reading of Professor Koch's work on the relation of quinine to blackwater fever, he had refused to take quinine for his fever. Unfortunately, however, he seems to have been under the impression that phenacetin (which was a common household remedy in Uganda for the febrile paroxysm) was of the nature of a prophylactic and was in the habit of taking one or more 5-grain tabloids daily, so much so that though his travelling companion told me that he had started from the coast with a number of bottles of this drug, there were none in his possession at the time of his death. Whether he had been taking any just previous to his illness I cannot say, but I know that he had none ten days before his illness when I met him on the road with his caravan and he asked me for some.

As I understood he had six bottles each of 100, 5-grain, tabloids when he left the coast, in less than sixty days he must have taken 3,000 grains of the drug. When he was taken ill, I was, as was his regular medical attendant, ignorant of this state of things, and it only came to my knowledge on making enquiries, after finding several empty phenacetin bottles among his things after death.

The disease from which he died was an ordinary attack of acute dysentery of a not very severe kind. The ultimate cause of death was undoubtedly the result of failure of the dilated heart. The extraordinary depression from which he suffered all through his illness and the rapid dilatation, which were such puzzling features of the case, may, I think, be fairly attributed to the inordinate use of phenacetin. The dysentery itself was far from being severe, but in this case it was accompanied by an extreme depression and despondency followed by acute cardiac dilatation, so rapidly fatal, in spite of treatment.

I am aware that some French observers have noted heart dilatation as a fairly common complication of acute dysentery. This may be so, but has not been my experience either in Uganda or Egypt.

I am sorry that in this case we ever attempted to give the classical ipecacuanha. The melancholy and depression were at first put down to the natural homesickness of a man just from leave and the treatment was persevered with. In this I think we were wrong. Of all the recognised methods of treatment, it is the most unpleasant, worrying and distressing, and I have long since abandoned it.

The treatment of dysentery by ipecacuanha in massive doses was perhaps the one solid fact that stuck in the mind of the student in the days before we had Schools of Tropical Medicine and Students' Manuals. However brilliant may have been the results that warranted the enthusiasm of Indian practitioners, my own experiences have been deeply disappointing, and I have met many tropical practitioners who have had the same experience. Whether it be that the dysentery of India and the East is different from that of Egypt and Central and Equatorial Africa, I can venture to express no opinion, but certain it is that while some of us employ salines and others local irrigation, very few employ ipecacuanha, owing to its depressing effect. Had I known then what I know now of his history, I should have advised a very different line of treatment.

There are two other points to which this case draws attention, (1) that it behoves medical men to exercise the most careful supervision over their published utterances, lest they may disturb the faith of an intelligent and unscientific laity in any recognised form of treatment, and in avoiding one danger, they fall into a greater. Those who have disturbed the faith of the laity in quinine and have frightened them with the bogey of hæmoglobinuria have much to answer for, for they have often destroyed a faith in a prophylactic of proved practical value and given the doubter nothing in exchange.

The other point is that the case draws attention to what is, and is probably so elsewhere, a real danger—the indiscriminate use of coal tar antipyretics in malaria. My own experience is that the need for them in malaria is limited to a comparatively few cases only ; that they are cardiac depressants and reduce the temperature only at considerable cost to the patient's strength. That they accelerate the sweating stage I doubt not, but Dover's powder does so just as well and more safely. When phenacetin is used, it should always be given with a stimulant, of which a little whiskey is a useful and generally handy example.

Assouan, Upper Egypt,
May, 1903.

HORDER'S CLINICAL CASE FOR BLOOD FILM WORK, &c.

Designed by Edward Horder, F.R.C.S.Edin..

THE accompanying illustration represents a plated metal box, $3\frac{3}{4}$ in. by $3\frac{3}{4}$ in. by $1\frac{1}{2}$ in., made for me by Charles Baker, Optician, 244, High Holborn, London, W.C.

It is divided into partitions which contain all the requisites for staining blood, sputum, &c., and will, I think, prove useful to those who make a study of the blood, &c., a routine practice.

Contents : Glass slides, 3 in. by 1 in. (this space will hold 2 aluminium frames to be used instead of glass slides). Glass bottle with india-rubber bung, to hold 2 sizes cover-glasses. Two glass stoppered bottles for staining fluid, *e.g.*, carbol-fuschin and Jenner's stain. One stoppered bottle for alcohol, and one measure glass, grad. cc. Pipette, vaseline, brush, &c., &c. Cover-glasses when spread with blood, &c., ready for staining. "Soloids" of various staining powders. Tissue paper for blood spreads. Pestle, mortar and funnel. Hollow lid for forceps, filtering paper, needles, linen, &c. Hinged ring, which can be thrown out to receive glass filter or small bottle. Spirit lamp, watch glasses, and stand for use in heating stains.

The same firm has also made for me an aluminium frame, the object of which is to obviate the necessity for carrying a large number of the usual 3 in. by 1 in. slides.

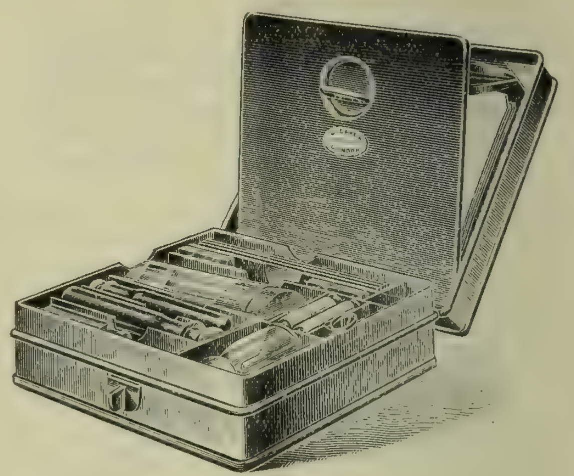


FIG. 1.

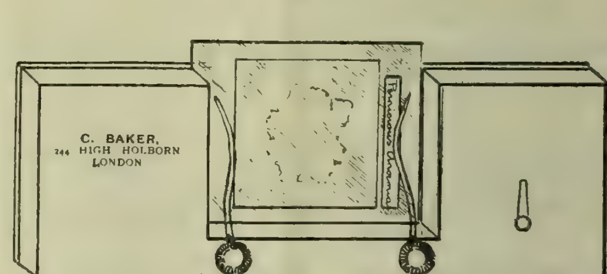


FIG. 2.

The frame is 76 mm. by 26 mm. (3 in. by 1 in.), with an opening of 33 mm. by 24 mm. A glass slide, 76 mm. by 26 mm., is attached to the under-surface of the frame by means of screws. There are two springs in the opening for holding a large cover-glass, 32 mm. by 24 mm., firmly to the glass slide, and also a small spring on the frame for securing a provisional label.

To prepare the frame for use, a 32 mm. by 24 mm. cover is laid on the glass slide beneath the two springs ; the specimen, on a smaller cover, is placed on the centre of the larger one, and is now ready for examination.

For specimens which are to be stained, the blood can be spread on either cover, but for wet ones requiring immediate examination, the smaller cover should receive the drop of blood.

The glass slide beneath the frame is made of the best white plate glass, and will, with ordinary care, need but an occasional renewal.

The two sizes of covers with the frame are the only

apparatus required for all ordinary clinical work, the frame rendering the carrying of slides quite unnecessary. Should the frame be wanted for use with lamp light, a blue tinted slip can be inserted in place of the white one without trouble or loss of time. When ordering the frame from the makers it should be stated whether this extra slip is needed.

It is believed that this frame will be a help to many, especially to those who are obliged, either from choice or duty, to travel longer or shorter distances, and with whom every *ounce* is a consideration, not to mention the deterioration of glass slides. To such, a packet of covers will be all that is required.

I should mention that the dimensions of the "opening" can be made to fit any cover-glass, provided the size required be given at time of ordering. Another

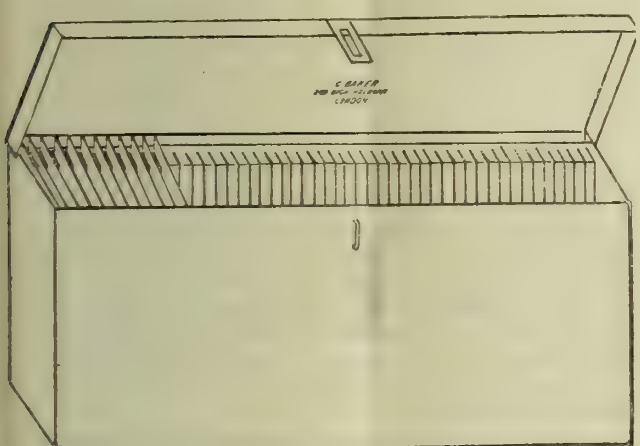


Fig. 3.

advantage is that the storing or preservation of specimens requires but an infinitesimal amount of space compared with the ordinary 3 in. by 1in. slides, and the great difference of weight is also in favour of covers and frame.

Fifty specimens, when covers are used, can be packed away in a box measuring 3 in. by 1 in. This box, also made for me by Charles Baker, is of aluminium, and remarkably light. The sketch shows projecting teeth, between which the specimens are placed end-ways. On the larger of the two covers sufficient space will be found for a permanent label.

The frame and boxes being of metal, no danger of warping or breakage need be feared, two strong recommendations to those working in the tropics.

Measles in Fiji.—An epidemic of measles is spreading rapidly throughout Fiji despite all the precautions and attention of the local authority. In Suva alone 225 cases have been reported. The Suva Public School has been closed, owing to the number of cases amongst the children. Fifty of the armed native constabulary are down with measles and eighteen of the police.

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THE

Journal of Tropical Medicine

June 1, 1903.

TRYPANOSOMA CASTELLANII.

Kruse, in a recent communication to the Medical Society of Bonn, referred to Castellani's investigations into the cause of sleeping sickness, and named the trypanosoma found in the cerebro-spinal fluid and blood of patients suffering from sleeping sickness the *Trypanosoma Castellanii*. The inference, therefore, is that Kruse considers the trypanosoma found by Castellani to be different from those already known in patients suffering from trypanosoma fever and described by Dutton (*Trypansoma Gambiense*). Be this as it may, there is no doubt that the discovery of a trypanosome in the cerebro-spinal fluid of persons suffering from sleeping sickness is an important one, and all credit is due to the young scientist who has added this fact to our stock of knowledge.

Dr. Aldo Castellani, although only 28 years of

age, has had a distinguished career. He studied in Florence, where he qualified in June, 1899, with highest honours. He worked under Kruse and Finkler in the bacteriological laboratory at Bonn for one year. He spent another year in the bacteriological department of the Jenner Institute, London, under MacFadyen; and after studying at the London School of Tropical Medicine, went to Africa to investigate sleeping sickness as bacteriologist to the Royal Society Commission. One of the earliest investigations undertaken by Dr. Castellani, and published in the *Settimana Medica*, 1899, No. 3, was entitled *Il bacilo di Eberth nel sangue*, and since then he has contributed many important papers, amongst which we find: "Upon a Special Method for the Detection of the Typhoid Bacillus in the Blood" (*Centralb. für Bakt.*, Bd. xxxi., p. 10); "On Hæmolysins Produced by Certain Bacteria" (*Lancet*, February 15th, 1902); Die Agglutination bei Gemischter Infection und die Diagnose der letzteren (*Zeitschrift für Hygiene und Infection-krankheiten*, 1902).

His testimonials from Professor Kruse, Dr. Patrick Manson, Major Ronald Ross and Professor MacFadyen speak highly of his attainments as a bacteriologist, and it must be a matter of satisfaction to these eminent scientists to know that Dr. Castellani has fulfilled their expectations. In the article on the "Researches on the Etiology of Sleeping Sickness," which we publish in this issue, it will be noted that Dr. Castellani remarks: "I do not see any reason why man should not be attacked by different species of trypanosoma, each of which might give rise to a different disease. This fact has been clearly demonstrated in the lower animals. The horse, for instance, is liable to be infected by three different species of trypanosoma: *Trypanosoma Brucei*, the cause of Nagana; *Trypanosoma Evansi*, the cause of Surra; *Trypanosoma equiperdum* (Döflein), the cause of the disease called "Dourine." This is a most interesting suggestion, and opens up a large field for research.

Dr. Castellani states that he found the trypanosoma in the blood as well as in the cerebrospinal fluid of patients suffering from sleeping sickness; this fact appears to call for further investigation not only in regard to the differentiation of trypanosomes, but also to a closer pathological study of the seemingly different ailments induced by the possible varieties of the parasite.

Reprint.

FILARIA PERSTANS.

By George C. Low, M.A., M.B., C.M.
Medical Superintendent and Tutor London School of Tropical Medicine.

The embryonic or larval forms of *Filaria perstans* were first discovered by Manson in 1891 in the blood of a West African negro suffering from sleeping sickness, who was under the care of Dr. Stephen Mackenzie in the London Hospital. Later, in films of blood sent from Old Calabar and the Congo, he found the same parasite, and in 1897 described small sharp and blunt-tailed filarial embryos in specimens of blood sent by Dr. Ozzard from British Guiana, which he provisionally named *Filaria Ozzardi*.

Daniels, in 1897, confirmed the latter observations by finding that those embryos were very common in the blood of the aboriginal Indians of the interior of British Guiana, and in the following year he discovered the parental forms of the blunt variety.

Adult forms of the African blunt-tailed embryo were next found at the necropsy of one of the negroes who died from sleeping sickness in Charing Cross Hospital, and Manson, after a comparison of those with the British Guiana forms, came to the conclusion that they were identical, and so cleared up the life-history of his original embryos, which he had named *Filaria perstans*.

Geographical Distribution and Prevalence.

South America.—Filaria perstans, as Daniels and Ozzard first pointed out, is very common amongst the aboriginal Indians in the interior of British Guiana, though not being found in Georgetown and the coast adjoining.

While studying filarial diseases in the West Indies in 1901 I did not once meet with it in the blood of large numbers of individuals examined in St. Kitts, Dominica, St. Lucia, Barbadoes, St. Vincent, Grenada, or Trinidad, but as already mentioned, it was exceedingly common in British Guiana. Out of a total of 163 Indians seen in different parts of the dense tropical forests, no fewer than 94, or 57·6 per cent., exhibited the parasite in their blood, 56 of those being pure infections, while in the other 38 it was associated with sharp-tailed embryos. Although it is not found in Georgetown and in New Amsterdam, nor the cultivated strip of the

coast lying between those two towns, it is common on the coast to the north near the Venezuelan boundary where the forests come down to the sea, Warau Indians living at the mouth of the Waini river being found to be infected.

There is little doubt that the same parasite, if looked for, would be found in Dutch and French Guiana, Brazil, and in parts of Venezuela where the tropical forests are dense, and its distribution therefore is probably a much more extensive one in South America than we at present know of.

Africa.—Manson has shown that the parasite is common on the Congo, Old Calabar, and other parts of the West Coast of Africa. 30 out of 54 individuals showing it in blood slides sent to him by Professor Firket from the Congo, and 35 out of 61 in slides sent from Banza Mankeka. Further, Dr. Rice has lately informed me that he found *Filaria perstans* in 50 per cent. of the people of Ibadan in the hinterland of Lagos, and the members of the Liverpool School of Tropical Medicine expeditions have also found it in other parts of the West Coast of Africa.

On the East Coast of Africa it is not found in the towns of Zanzibar or Mombasa; nor amongst the Masai, a large tribe inhabiting the highlands beyond Nairobi; nor amongst the Kavirondo, who dwell along the north-east shores of the Victoria Nyanza lake.

In Uganda, on the other hand, as Moffat, Hodges, and Cook have shown, it is extremely prevalent in many areas of that large province.

I found it in 86 out of 100 people from the Sese Islands to the south of Entebbe; in 62 out of 100 in Bulemezi and Mugema respectively, districts some distance north of the lake; and Moffat and myself got it in 76 per cent. of the people of Unyoro, the province lying to the east of the Albert Nyanza. In the Alur tribe, from near Wadelai on the Nile, Bagshawe and myself found that it was not so common, only 4 out of 48 having it. To the south Daniels found one case in a native of British Central Africa on Lake Nyassa.

Physical Features of the Country where Filaria Perstans is Found.

So far *Filaria perstans* has only been found in or near the Equatorial belt, where the temperature is high and the atmosphere saturated with moisture, examples of those places being the tropical forests of South America, the steamy forests of the Congo, and Uganda, where tropical forests alternate with enormous swamps and open ground. In Kavirondo, as already mentioned, where the forest disappears and the land is covered with scrub and short grass, it is not found, nor on the grassy plains of the highlands of British East Africa. Towns and areas where the forest has been cut down and cultivation taken its place, as on the coast-line of British Guiana, are also exempt from it.

The Embryonic or Larval Form.

The anatomy and measurements (0·203 to 0·205 mm. by 0·0042 mm. broad) of the embryos of *Filaria perstans* correspond closely to those of *Filaria Demarquaii*, but it can readily be distinguished from those by its blunt or rounded tail.

TABLE I.

Date and Hour	Case I. Number of *F. perstans* in 5 cmm. of blood	Case II. Number of *F. perstans* in 5 cmm. of blood	Case III. Number of *F. perstans* in 5 cmm. of blood	Case IV. Number of *F. perstans* in 5 cmm. of blood
Sept. 8th, 1902, 10 a.m. ...	16	12	10	15
,, ,, 2 p.m. ...	8	17	10	17
,, ,, 6 p.m. ...	19	8	13	19
,, ,, 10 p.m. ...	10	6	10	10
Sept. 9th, ,, 6 a.m. ...	10	4	18	10
,, ,, 10 a.m. ...	14	15	8	14
,, ,, 2 p.m. ...	10	10	10	10
,, ,, 6 p.m. ...	7	8	11	7
,, ,, 10 p.m. ...	5	10	11	9
Sept. 10th, ,, 6 a.m. ...	11	10	9	15
,, ,, 10 a.m. ...	10	10	10	10

TABLE II.

Enumeration of F. Perstans in 5 cmm. of Blood from the Different Internal Organs and in Lymph.

Case I. Died 6 p.m., September 30th, 1902. Number of *F. perstans* in 5 cmm. of blood on that day—8 a.m., 0; 4 p.m., 4. Necropsy, 6 a.m., September 31st, 1902.			Case II. Died 3 p.m., September 16th, 1902. Number of *F. perstans* in 5 cmm. of blood on that day—2 p.m., 7. Necropsy, 4 p.m., September 16th, 1902.		
Organ	No. of slides	No. of *F. perstans* in 5 cmm. of blood	Organ	No. of slides	No. of *F. perstans* in 5 cmm. of blood
Heart, L. vent. ...	1	19	Heart, L. vent. ...	1	11
,, R. vent. ...	1	14	,, R. vent. ...	1	24
Lung, R.	1	14	Lung, R.	1	10
,, L.	1	17	,, L.	1	15
Liver	1	1	Liver	1	0
Spleen	1	0	Spleen	1	0
Pancreas	1	2	Pancreas	1	1
Kidney, R.	1	0	Kidney, R.	1	8
,, L	1	0	,, L.	1	2
Aorta	1	30	Aorta	1	10
Superior vena cava ...	1	16	Superior vena cava ..	1	10
R. common carotid ...	1	4	R. common carotid ...	1	24
R. internal jugular vein	1	10	R. internal jugular ...	1	7
L. saphenous vein ...	1	7	L. saphenous vein ...	1	10
Sup. longitudinal sinus	1	7	Sup. longitudinal sinus	1	4
Subdural vein ..	1	8	Subdural vein ...	1	2
Brain, capillary motor area	1	1	Brain, capillary motor area	1	8
R. middle cerebral ...	1	0	Capillary at base of brain	1	1
Smears not measured...	—	—	Smears not measured	—	—
Lateral ventricle fluid...	1	0	R. lateral ventricle fluid	1	0
Mesenteric gland, A. ...	2	0	Femoral gland ...	1	0
,, ,, B. ...	2	0	Neck gland	1	0
,, ,, C. ...	2	0	Mesenteric gland ...	1	0
Cervical gland ...	1	0			
Femoral gland ...	1	0			

The cephalic armature as seen in fresh specimens consists of a non-serrated prepuce, difficult to make out, and the little fang first described by Manson. A

V-spot with the angle more obtuse than that seen in *Filaria nocturna* is present, but it is difficult to say if a tail spot is or not. In stained specimens a break in the continuity of the central column of cells anterior to the position of the V-spot is seen. They have no sheath, and locomote freely over the slide on which one examines them. Their numbers in the peripheral blood vary, being equally numerous, however, by day as well as by night, that is, they observe no periodicity. The four cases in Table I. demonstrate this.

In determining the number of filarial embryos in the blood at any given time, it is of the utmost importance that the same quantity of blood should be used each time, and it may not be out of place here to give the technique employed. A pipette graduated to 5 cmm. may be used, and this quantity of blood, after being sucked up, is blown out on to a slide, spread out, and allowed to dry. The hæmoglobin is washed out by placing the slide for a minute or so in water, and after this the film is fixed in alcohol and ether, stained with fuchsin or hæmatoxylin, and the number of filariæ present accurately counted.

By this method an examination of the blood from the viscera and large vessels of the thorax in cases that have died reveals the fact that the special seat of selection of the parasites is apparently not in the peripheral blood but in that of the heart, lungs, aorta, and other large vessels. They are never found in the spleen, and only rarely in the liver and pancreas (see Table II.).

(*To be continued.*)

Correspondence.

To the Editors of the Journal of Tropical Medicine.

Sirs,—In reading the article "Medical Officers in British Protectorates," in your issue of October 15th, it struck me that a few notes on the medical service that I was attached to might be interesting.

A medical man on joining this service usually receives 200 dols. per mensem as salary (the exchange at the present day being 1s. 7½d. per dollar), and on account of the unstable condition of the dollar, the Company are at the present moment paying all its Officers at 1s. 10d. to the dollar.

Free quarters with plain furniture are provided, and there is a travelling allowance of 2 dols. 50 c. per day when away on duty from place of residence.

There is no pony allowance, and in some stations the distances to travel are very long.

The duties for the above-mentioned salary are as follows: Attendance at the Gaol, Barracks and Hospital, and upon all officials, their wives, families and servants. Attendance in Court and at Coroner's Inquest when subpœned by the Government. Conduct *post-mortem* examinations when called upon to do so. Visit the Leper Station (where such exists). Examine all steamers arriving from infected ports; superintend the disinfection of steamers when necessary, and visit the quarantine station. Superintend vaccination. Collect the reimbursements from the hospital for the Government. Take meteorological observations and send in quarterly reports and monthly returns, in addition to numerous other kinds of clerical work. As Health Officer, sit at the Sanitary Board Meetings. Examine any sample of water, milk or food sent by any official, as well as attend upon the Government cattle. To sum up, a Medical Officer is: Physician, Surgeon, Accoucheur, Public Health Officer, Meteorologist, Analyst and Veterinary Surgeon.

There is no written promise of increase of salary, an increase is hardly known. Private practice is allowed, and the former system of charging the Medical Officers 15 per cent. on ordinary practice and 50 per cent. on contract practice is no longer continued.

It does not follow that the senior medical officer draws more pay than his junior, for at the present day the junior is receiving more, if not double, the salary of his senior.

Passage out has to be paid by the successful candidate to these lucrative posts, but is refunded after three years' service; the agreement is usually for five years.

There is no pension. Furlough is granted after 5 years' service, viz., two months on full pay and fourteen months on half pay at 3s. per dollar. Since 1899 eight medical men have resigned.

I am, Dear Sirs,
Yours faithfully,
"One of the Eight."

January 9th, 1903.

[The above letter does not refer to employment in a Crown Colony.—Ed.]

New Drugs, &c.

"Tabloid" Bromides Compound.—Messrs. Burroughs, Wellcome and Co., have prepared a useful tabloid with the following formula:—

℞.	Sodium Bromide	grs. ii.
	Strontium Bromide	grs. ii.
	Ammonium Bromide	gr. i.
	Sodium Arsenate	gr. $\frac{1}{60}$.

A combination of the bromides is believed by many to be more efficacious than when any one bromide is given separately.

"Tabloid" Coffee Mint:—

℞.	Sodii Bicarb.	grs. ii.	=	·194 grammes.
	Ammonii Carb.	gr. $\frac{1}{16}$	=	·004 ,,
	Ext. Coffeæ	gr. $\frac{1}{2}$	=	·032 ,,
	Cerri Oxalabis	gr. $\frac{1}{4}$	=	·016 ,,
	Ol. Menth. Pip.	q.s.	—	q.s.

Messrs. Burroughs, Wellcome and Co. have introduced this tabloid, which consists of a combination capable of affording marked relief in gastric and hepatic disturbances. Its medicinal action is somewhat similar to that of "Tabloid" "Soda-Mint," as it contains the same proportions of sodium bicarbonate, ammonium carbonate and specially fine oil of peppermint as are present in that preparation. In addition, however, each product contains coffee extract and cerium oxalate. This modification increases its range of usefulness. It retains the properties of "Tabloid" "Soda Mint" as a neutralising agent and diffusible stimulant, and is used for the relief of flatulence with acidity, and the insomnia arising therefrom. It is also prescribed in the nausea of liver derangement. The presence of cerium oxalate renders this preparation of special service in treating the vomiting of pregnancy; and the coffee extract acts as a nerve stimulant.

Notes and News.

Egyptian Ophthalmia.—"Eye Affections in Egypt," by Dr. Baudry (*Nord. Médical*, 1903, January 15th). The author of this article, who is professor of ophthalmology at Lille, reports that on his recent visit to Egypt, on the occasion of the Egyptian Medical Congress, he made a special study of the endemic eye affections of the country, and has come to the conclusion that they in no way differ from the ocular disorders found elsewhere, and that "Egyptian ophthalmia" is nothing more nor less than trachoma combined with a catarrhal or purulent condition of the conjunctivæ. The frequency of eye affections and their contagious nature is explained by the climatic and hygienic conditions under which the people live. Hygiene is commencing to be appreciated by the lower classes, and as a consequence the frequency of trachoma has been considerably diminished during recent years.

A large number of well-known medical men of Philadelphia have organised a Society of Tropical Medicine, the main object of which is the tuition of the special medical knowledge requisite for practice in tropical regions to students and post-graduates. The following medical men form the committee of this association: Dr. Fenton, President, Prof. J. C. Wilson and J. Anders, Vice-Presidents, Prof. Joseph McFarland, Secretary; Prof. E. B. Gleason, Dr. John V. Shoemaker, Prof. Judson Daland, Dr. R. G. Curtin, Prof. Orville Horwitz, and Dr. Hobart Hare.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Actinomycosis.

Sixty Cases of Actinomycosis.—R. von Baracz (*Annals of Surgery*, March, 1903) gives a general description of this disease as seen in Galicia. Concerning treatment, he says that as the disease generally produces a hard wall around the softened area and this wall hinders the extension of the process, he has endeavoured to produce such a wall which consists of connective tissue, by the hypodermic injection of irritants like tincture of iodine and 20 per cent. solutions of silver nitrate. In this way he was able to cure his last nine cases without operation. He states that silver in this strength not only produces a boundary wall, but also kills the fungus. As to animal inoculation, he tried it in mice, pigeons, hens, dogs, and rabbits.

Beri-Beri.

Beri-beri, by Ph. Laoh, Batavia.—Dr. Laoh, in his recently published work on the "Etiology, Prophylaxis and Therapeutics of Beri-beri," states that beri-beri arises in consequence of long persistence in a uniform diet. He does not believe in the toxic effects of rice, provided that rice, even when of inferior quality, is partaken of along with other food, such as vegetables, and with spices. Sameness of diet tends to cause the development of microbes in the alimentary canal, and thereby generate microbes. Laoh believes that the microbes met with differ in the several varieties of beri-beri met with. He lays special stress upon the benefits of taking spices with the food in checking intestinal fermentation. The treatment consists of the administration of purgatives, carminates, and a varied diet in which vegetables and spices are included. In chronic cases it is well to substitute pulse from the *Phaseolus radiatus* for rice, but in recent cases rice may be continued to be eaten with impunity.

Hæmoglobinuric Fever.

Hæmoglobinuric Fever, Causes and Treatment, by Walter Shropshire, Yoakum, Texas. *Med. Record*, May 16th, 1903.—Dr. Shropshire, in a report of 202 cases, showed that 61 treated without methylene blue, or with less quinine than 5 grains per diem, 26·2 per cent. died; while of 112 cases treated with 20 grains or over of quinine, 16·9 per cent. died. Four were treated with methylene blue, with one death. It was shown that quinine not only lowered the death-rate, but also lowered the percentage of recurring paroxysms. The following are the conclusions arrived at: (1) That this disease always occurred in persons suffering repeated attacks of malaria; (2) that it nearly always followed one or more paroxysms of malaria at the proper time for its next exacerbation; (3) it had all the characteristics of malaria, chill, fever and sweat; (4) that where adequate examination of the blood was made the hæmatozoa of malaria was found; (5) its habitat—that of the most violently malarious districts.

Quinine and Hæmoglobinuria.—After a review .of the effects of quinine it was difficult if not impossible to conclude logically that it could produce hæmoglobinuria. Summing up the evidence for and against quinine as a cause of this disease, Shropshire stated that 29·4 per cent. of physicians affirmed and 70·59 denied it. When quinine was suspended, 73·8 per cent. recovered; when quinine was administered, 83·1 per cent. recovered. Distinct recurrences of attacks after the first appearance of black water in non-quininised patients, occurred in 9·8 per cent.; distinct recurrences of attacks after the first appearance of black water in quininised patients, 4·4 per cent.; of cases occurring from quinine alone 0 per cent.; of cases occurring from malaria without quinine, 15 per cent.; of cases in which quinine was supposed to aggravate, 5·9 per cent.; of cases in which quinine was thought not to aggravate, 55·41 per cent. This gave a preponderating evidence against quinine as a causative factor in the production of this disease.

Treatment.—In the treatment of this condition Shropshire advised giving 40 grains of quinine per diem, either intravenously or hypodermically, until the next period of an exacerbation had passed; then it should be discontinued for three or four days, and

then repeated in 20 to 30-grain doses every four to six days, until five or six weeks have passed without a paroxysm. Attention to liver and bowels was emphasised, with the ingestion of large doses of very hot water.

Pes Gigas.

Congenitale Partielle Hypertrophie des Fusses [Congenital Partial Hypertrophy of the Foot]. (*La Revue Médicale de l'Afrique du Nord*).—Legrand observed this condition in a European. The right foot only was affected. The X-rays demonstrated the fact that the three inner metatarsi were hypertrophied. The second and third phalanges were united and exhibited a bony substance. The termination of the toes was club-like in form. Radiography also demonstrated that the three inner metacarpal bones and the first phalanges of the right hand were also hypertrophied. The hypertrophy only affected the breadth, not the length of the bones. Raynaud reports hypertrophy of the left foot in a Cabyl, the big toe being the size of an orange, the second toe was enlarged, but to a less degree, the third toe was slightly hypertrophied, and the two others were normal.

In the Journal of Tropical Medicine, January, 1900, a plate of what is evidently a similar affection to those described above is given under the name of Pes Gigas.

Plague.

The Spread and Prophylaxis of Plague. *Med. Record*, May 16th, 1903.—In the discussion on plague during the American Medical Association Meeting, May 5th to 9th, 1903, Dr. W. J. Calvert stated that so long as such plague centres as Canton and Hong Kong existed, the disease was likely to appear in the Pacific coast of North America.

Dr. J. J. Kinyoun said that the *sine qua non* in prophylaxis was the accurate diagnosis of the first case, and that the clinical forms were so varied that errors in diagnosis of first cases were the rule. Plague might resemble anthrax, tonsilitis, mumps, diphtheria, erysipelas, pneumonia, acute pleurisy, malignant pericarditis, endocarditis, typhoid, typhus, relapsing and malarial fevers, acute dysentery, miliary tubercle, septicæmia, pyæmia, and syphilis. These forms of plague and its insidiousness and the inexperience of the profession rendered plague one of the most difficult to recognise. For diagnosis a bacteriological examination was essential.

Dr. F. G. Novy emphasised the fact that plague was essentially a disease of animals and primarily was not a human disease. The disease was transmitted by the bites of animals, such as the rats or rodents of China. How the disease was communicated to the human being, what was the portal of entry, was a very difficult question to answer and possibly never would be answered satisfactorily. The virulency of the germ decreased the longer it was kept in artificial culture. The organism he did not consider to be very resistent and could be easily destroyed. Besides isolation of the sick, disinfection, segregation, &c., he said we have a powerful method of controlling the disease, *i.e.*, by serum inoculation.

Yellow Fever.

The Mode of Transmission of Yellow Fever. *Med. Record*, May 16th, 1903.—In a discussion on this subject before the American Medical Association, May 5th to 9th, 1903, Dr. James Carroll claimed that yellow fever could be produced by the mosquito only.

Dr. Stamford E. Chaillé stated that he had never secured satisfactory evidence of the proof of a single case of yellow fever either by direct contagion or of infection by fomites.

Dr. C. W. Stiles, of Washington, said there were certain biological facts in the consideration of yellow fever. The cause of the disease belonged to one of three different groups: (1) Bacterium, (2) flagellata, and (3) sporozoa. The entire history of the disease, with its short incubation period, &c., shows that the organism was probably reproduced by non-sexual methods. The bacterium seemed to be excluded by the history of incubation in the mosquito. Regarding the flagellata, nothing was known regarding its sexual development. He thought the parasite which was the cause of the disease possibly was a sporozoite.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—JUNE 15th, 1903.

Original Communications.

ON PRE-PUPAL CHANGES IN THE LARVÆ OF THE CULICIDÆ.

By G. M. GILES, M.B., F.R.C.S., F.R.M.S.
Lieut-Col. I.M.S. (Retd.).

PERHAPS no other of the curiosities of development are so striking, alike to the popular and scientific imagination, as the changes that take place during the pupal stage of insect life, whereby the worm-like larva is transformed into the complete insect; and this is especially the case where the change, as in the case of the *Culicidæ*, is accomplished to all appearance in what appears a most inadequate allowance of time.

We have always been accustomed to regard the *Culicidæ* as insects undergoing a "complete metamorphosis," that is to say, that the changes which transform the larva into the adult are not spread gradually over the period of growth, with its various changes of skin, but are all effected during one and the last ecdysis, viz., that of pupal life; during which the insect ceases to eat, and is often reduced to a more or less motionless bundle, which no longer grows, but re-arranges the nutritive materials which it has collected as a larva into the shape of the widely different anatomy of the adult. In the *Culicidæ*, however, the pupa, though incapable of feeding, is never quite motionless and helpless; and so far from the sum total of the changes that transform the larva into the imago being compressed into the three or four days of pupal existence, most of the adult appendages are, as we shall see, well advanced in development within, at any rate, the last larval skin. It is never practically possible to be sure of the age of a larva with any exactitude, as to its stage of ecdysis, as, like the adults, they vary much in size; certain full-grown larvæ just ready to enter upon their last, or pupal, change of skin being quite frequently less in actual dimensions than others that may be junior to them by one or two larval ecdyses; and on this account, although many larvæ have been examined, it is quite a matter of chance that one obtains for examination a specimen which has actually fully completed its stage of larval life.

In the accompanying plate I have placed, for comparison, in the middle of the page a drawing of the transverse section of the pupa of *Anopheles Rossii* through the mesothorax at the level of the roots of the wings, and have grouped round it four drawings of transverse sections of a full-grown larva at various levels.

Taking first the key section of the pupa (fig. 1), we find that like that of the adult, at the same level, the body consists essentially of a solid mass of the muscles which for the most part actuate the somewhat complex movement of the wings above and the legs below. Almost on the middle of the section is the œsophagus with, immediately below it, the rudiment of the pneumatic vesicle. Grouped round these are four glandular cords, the shrinking remains of the hepatic crypts of the larva; and, immediately above the upper pair of these are cut across the two great main longitudinal air-vessels. Further below, on the middle line, imbedded between the two sets of muscles that are to actuate the coxæ of the middle pair of legs, is seen the section of the thoracic mass of ganglia.

So far, save in the incomplete development of the pneumatic vesicles and in the presence of the still recognised remnants of the hepatic crypts, there is really very little to distinguish the section from one cut across an adult; but it will be observed that this forms only the middle portion of the section, and, except in its dorsal aspect, has no share in forming its outer boundaries; their ventral aspect and sides being enveloped in a thick sac, separated from the body by a large air space, which, as will be seen, imparts to the larva the necessary buoyancy to keep it afloat.

The walls of this sac are double, and completely separated from the true body of the pupa, except at the points where the budding extremities take their origin; and between its walls lie the developing appendages of the adult, which are sometimes cut across more than once, on account of their being folded on themselves.

In the middle line below are seen the upper and lower lips, with the hypopharynx between them, and just outside these the mandibular and maxillary styles.

Immediately outside these are seen sections of the palpi, followed by six sections of the three folded pairs of legs; and still further out a couple of sections of the also folded antennæ. Uppermost and outermost of all are seen sections of the limp, crumpled wings.

If we now compare with this fig. 2, a section of a full-grown pupa at the same level, we find that the essential difference lies in the fact that the great air space is entirely wanting, and that the larva is flattened from dorsum to venter, instead of being, like the pupa, compressed from side to side. The great masses of muscles are as yet wanting, and represented only by soft nuclear tissue. But apart from this, the two sections are completely comparable, the appendages, as well as the visceræ, being already more or less completely represented. Taken as it is, at the level of the origin of the wings, the section divides the intestinal canal exactly at the point of entry into it of the four pairs of hepatic crypts, which are thus here represented by four semilunes.

The wings themselves, already far developed, are on account of their less horny consistency distinctly thicker, if less in area than in the adult. Following the periphery of the section, we find on either side of its ventral aspect a compartment containing sections of the rudiments of the three legs, and in the middle line a small mass of tissue, as yet not distinctly differentiated, but which obviously represents the commencement of the unpaired structures of the mouth to be found in the corresponding position in the pupa.

If we now pass to the examination of a section carried across this mature larva at the anterior part of the mesonotum, we find that between the sections of the rudimentary legs and the now separate median structure lie a pair of developing masses, which probably represent the commencement of the paired mouth organs.

The intestinal canal is lined with a plain endothelium of quadrangular cells, and on either side lie the salivary glands.

Coming still further forward to the examination of fig. 4, a section taken at the level of the pronotum, we find, springing from the dorsal aspect of the section, the already far-developed respiratory horns of the pupa, and outside these the anterior parts of the wings; while the ventral part of the periphery of the section is occupied by sections of the rudiments of the three legs.

The median mass has disappeared, and it is evident from this circumstance that the area of tissue so placed really corresponds, not to the thorax, but to the parts of the head of the adult insect, placed though it be, to all superficial appearance, under the very middle of the thorax. It is further worthy of notice that the lining of the intestinal canal is no longer glandular but chitinous; in other words, that the section is in advance of the midgut.

The other structures cut across are the salivary ducts and two large longitudinal air-vessels.

It remains only to examine a section carried across the metanotum, as in fig. 5. In this we find, surrounding the intestinal canal, the four great hepatic crypts of the larva. Springing from the side of the dorsum is the rudiment of the ballancer, which already contains an obvious ganglionic process, which is to be afterwards developed into what we believe to be an organ of hearing. Next to this we find, cut across, the hinder ends of the wing; and quite ventrally, a mass representing the hindmost pair of legs.

I have sectionised a considerable number of larvæ, but this is the only instance in which the specimen selected has proved to represent the larva in its last and most advanced ecdysis; and it is evident that the change from larva to imago is by no means as abrupt as we have been accustomed to think, and is spread not merely over one, but at least two changes of skin.

The position of the masses representing the mouthparts is at first rather difficult to explain, but is sufficiently easily understood when similar sections of larva and pupa are compared, though it opens up a distinct doubt as to whether the structures of the proboscis are really entirely referable to the head, as it seems really rather the more probable that, though attached to and in front of the head in the imago, they may really appertain to the ventral aspect of the thoracic segments; though, of course, the fact of their appearing in the same transverse section by no means necessarily implies this, as it is quite possible that the germinal masses representing these median prolongations of the adult head may be bent round so as to lie between but on the same level as truly thoracic structures; and it is needless to remark that this explanation is the easier to believe, even though it be the less easy to understand, when one is confronted with actual sections.

EXPLANATION OF ILLUSTRATION.

FIG. 1.—Transverse section of thorax of pupa, at the level of the origin of the wing (for comparison with the other sections).

FIG. 2.—Transverse section of a mature larva at the same level.

FIG. 3.—Transverse section of thorax of mature larva somewhat in front of preceding, showing the body of the salivary gland and rudiments of proboscis and limbs.

FIG. 4.—Transverse section of thorax of mature larva at the level of the origin of the respiratory syphons, in front of body of salivary gland, the duct of which now appears.

FIG. 5.—Transverse section of thorax of mature larva at the level of the origin of the ballancers.

In the above figures—*a*, thoracic muscles; *b*, ballancer; *d*, dorsal vessel; *e*, œsophagus; *f*, air cavity or float between body and appendages of pupa; *h*, hepatic tubules; *k*, hypopharynx; *l*, legs; *lbr*, labrum; *lm*, labium; *mb*, mandible; *mx*, maxilla; *n*, ventral nerve cord; *p*, rudiment of pneumatic vesicle; *pr*, proboscis; *s*, salivary gland or duct; *t*, main trachea; *w*, wings.

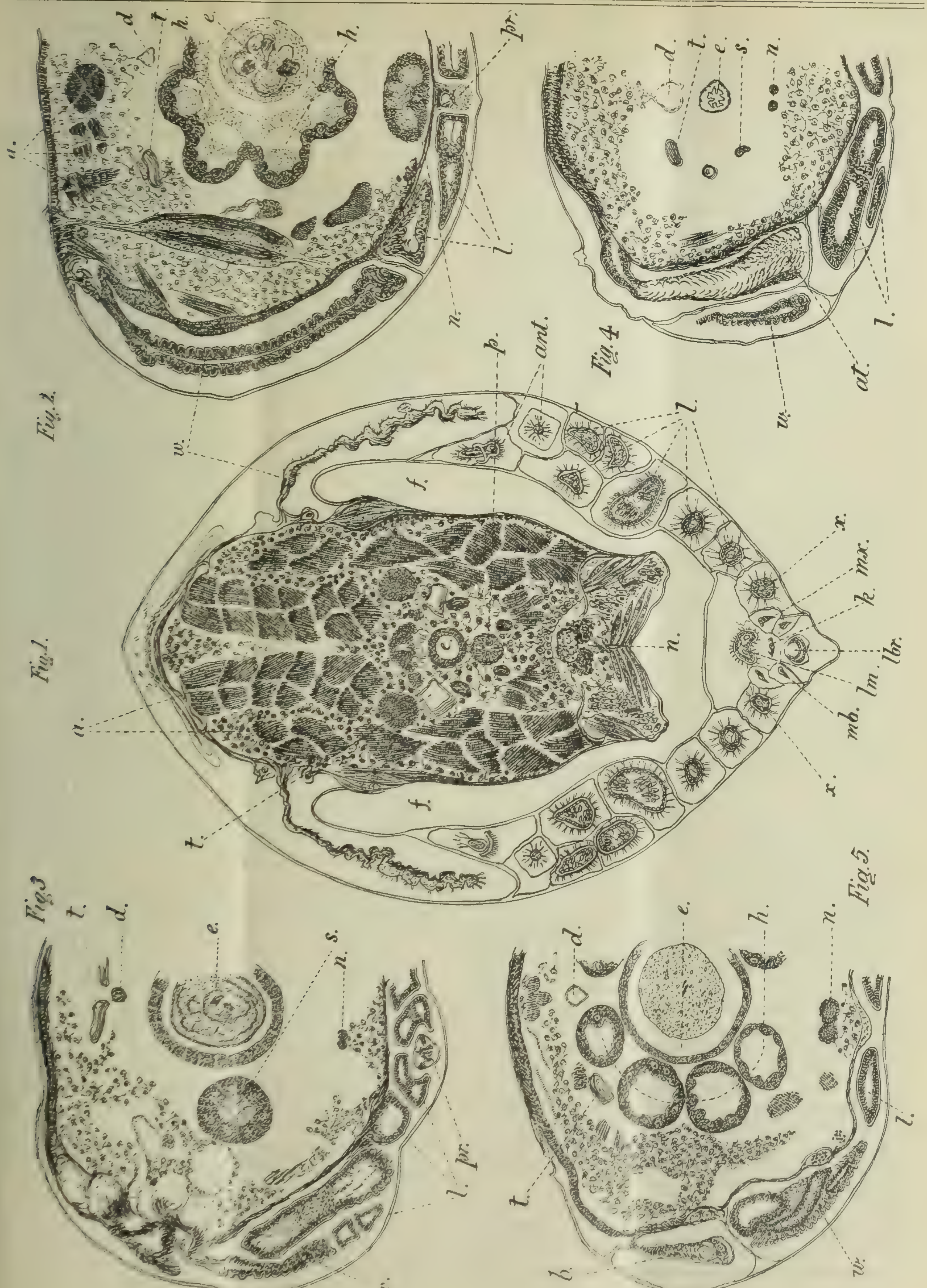


Fig. 1.
Fig. 2.
Fig. 3
Fig. 4
Fig. 5.

TYPHOID FEVER AMONGST THE NATIVES OF SOUTHERN CHINA.

By J. Preston Maxwell, M.B., F.R.C.S.

But little has been written, as far as I am aware, on the incidence, form and mortality of typhoid fever amongst natives living in tropical and subtropical regions.

As to the liability of Europeans to the disease known as tropical typhoid, and the increased seriousness of the disease as compared with the same affection met with at home, there is much known; but I have no intention of touching on the matter except in so far as it bears on the question of relative mortality.

In some quarters there is an impression, which was lately voiced by Dr. Clark,[1] of Hong Kong, in a paper on the subject, that the adult Chinaman rarely suffers from typhoid fever, and that the mortality amongst natives is so slight that some explanation must be found; and he suggested that many of the children had had typhoid fever in infancy or shortly after, and were thereby rendered immune.

He adduced in proof the number of deaths amongst children in Hong Kong from this disease as borne out by *post-mortem* statistics. I think I shall be able to show that this view, if correct at all, is only partially so. Since the publication of Dr. Clark's paper I have been keeping a sharp look out amongst children brought to me for treatment, or whom I have visited in their homes, for any confirmation of this theory. A great number of cases of fever have come before me, and simple diarrhœa and cholera nostras are not uncommon, but I have yet to meet with a case of typhoid under the age of twelve in my practice in this region, and most of my cases have been adults. These patients have been met with in the indoor practice of the Amoy and Changpoo mission hospitals, or are taken from my own visiting list in an area of country roughly about sixty miles long by thirty broad.

When I took up this question with a view to looking carefully into the matter, two or three questions at once obtruded themselves: (1) What are the conditions under which one may expect to find typhoid fever prevailing in this region, and are these conditions fulfilled in fact? (2) Is the diagnosis of typhoid fever in tropical countries as difficult as it has been made out to be? (3) Do typhoid fever and malarial fever run concurrently in the same patient? (4) Is the mortality of typhoid the same as amongst meat-eating races, in cool climates, and is there any difference in the ultimate cause of death in these cases, and in those specified above?

(1) What are the conditions under which one may expect to find typhoid fever prevailing in this region, and are these conditions fulfilled in fact?

To be able to answer this question, one must first look at the method of the disposal of excreta which prevails amongst the Chinese.

In the case of typhoid fever the excreta of importance are the fæces and the urine. The other channels of excretion may be disregarded in dealing with the question, as infection by their means is very rare.

How do the Chinese dispose of their fæces and urine? It must be borne in mind that there is no water carriage system in China, and that with few exceptions the sewers are open. It must also be remembered that the power of the sun is very great.

Fæces, and to a great extent urine also, are passed directly into large fæcal pits with concreted sides and bottom. This concreting in due time becomes rotten, and allows leakage to take place, and if situated near a well may prove a source of contamination. In some cases when these pits are full, they are allowed to remain many months till the contents are thoroughly rotten, and then used as manure for the fields. In other cases the pits are emptied from time to time and the fæces carried and stored in fæcal pits close to the fields themselves. In either case the material is not used till it has been well weathered and exposed to the sun.

At the same time each house has its large earthen jar standing in the courtyard for a urinal, several smaller pots in the house itself, and several wooden buckets for the use of the female portion of the family. These last are taken out and emptied at one of the fæcal pits daily. The urine is kept by itself and used in a fresh condition for watering growing vegetables.

Take the case of a typhoid patient: unless very ill he will walk out to one of the fæcal pits; if confined to bed, he will use one of the buckets before mentioned, or a bucket that has been used for carrying sewage. Probably in the course of maturation the bacillus dies, and unless the urine has been used on vegetables about to be gathered, then it too probably fails to carry infection.

In this region most of the houses have their own well, and it is rare for any large community to be supplied with drinking water from the same place.

It is clear that under these circumstances an extended epidemic was hardly to be looked for, but that the infection might very readily hang about a house, and owing to the lack of cleanliness spread from inmate to inmate.

As the fæces are never allowed to get dry in the pit there is little fear of infection being spread by dust. Flies, of course, may conceivably carry it to food.

Now what are the facts? Typhoid fever is endemic throughout the whole region and I have met with cases in every quarter; but I have never seen or heard of anything approaching a serious epidemic. I have seen a family of three boys, a girl, and her father and mother all going down with the disease one after the other. And here is another case. One of the officials of the Changpoo Church fell ill and was nursed at home for ten days, but as he was not getting on well I had him moved into the hospital, isolated and specially nursed. One of the hospital coolies was appointed to clean the bedpan, and specially warned as to the risk of infection. He was careless and contracted the disease, and so did the hospital preacher, whom I had good evidence to prove had been meddling in the same matter. The students, who were obedient to instructions, escaped. This patient recovered and went home well. In a few

[1] *British Medical Journal*, January 26th, 1901.

months' time his wife contracted the same disease, and in a few months more his younger brother also had a turn.

In some of these cases it was quite easy to trace the course of infection, but in the great majority it is quite impossible.

(2) Is the diagnosis of typhoid fever in tropical climates as difficult as it is made out to be?

To this question on unhesitating *no* may be given. If the physician carries about in his mind the fixed idea that as at home, every continued fever may be a possible typhoid, he will not make a greater percentage of mistakes than is made by a good physician at home. Naturally the main difficulty is to diagnose between this disease and malarial fever.

Malarial fever can be excluded in all but a minority, and that a very small one, by the immediate use of the microscope. If in the country, films may be prepared and examined on one's return. If the plasmodium is absent this simplifies the case; if present, then one cannot say that the malaria is the chief affection without further proof. Another positive sign may now be tried, viz., Widal's test. If this is positive (and in cases seen in the country a vaccine tube can be used to collect the blood which may be tested on return), then the case is cleared up. If negative, then it is not absolute proof that the affection is not typhoid; but in this case the severity of the illness, combined with the knowledge of the day of disease, will give a very fair clue to the extent on which this failure may be depended upon in the matter of diagnosis. I have used this test with living cultures of the bacillus, but I have the hope that in due time it will be found quite as satisfactory to work with sealed dead cultures of the bacillus carried in small capillary tubes.

Putting aside these positive signs, one has other data which rarely in my experience lead one astray. The first of these is the slight enlargement of the spleen, which is almost universally found in cases of typhoid fever. It is an early sign and a reliable one. As a general rule the spleen is easily made out with the tips of the fingers in the left hypochondrium, and is not tender. In acute malaria it is not at all unusual to have enlargement of the spleen, but it is tender, and sometimes acutely so.

The next sign which is of great use is the condition of the tongue. I think it is best described as the tongue of gastro-intestinal irritation. In some cases, owing possibly to the difference in food, you do not get the typical tongue, but you always get a heavily furred one, especially in the centre of the lateral masses, and as a rule the tongue becomes skinned, cracked, and in many cases almost raw during the course of the disease.

Another sign is the condition of the abdomen. In the native, though slight tympanites is common, you do not get the marked tympanites so frequently seen in cool climates and amongst heavy meat-eaters. Slight pain over the region of the lower part of the ileum is not uncommon, and that quadrant of the abdomen is in these cases kept more fixed during respiration.

Gurgling over the cæcum is not uncommon, but of little use in the diagnosis of the case.

Spots are present in about the same proportion of cases as at home, and are generally readily distinguished (in my experience) from other spots. But I should not be willing to make my diagnosis hang on these in a tropical climate. Diarrhœa occurs in typhoid patients in about the same proportion as at home, but is generally slighter in amount, and gives but little trouble to the physician. Constipation, which is not infrequent, is a much more difficult matter with which to deal. The Chinese are not by any means lovers of enemata, and in two cases I have brought on an attack of hæmorrhage in this way. Neither of the patients took any permanent harm, but the occurrence caused me considerable anxiety at the time.

Delirium is much rarer amongst native than amongst European patients, and when it does occur is not usually so severe. In like manner the depression of the patient is less marked. Possibly this is due to the quieter and less civilised mode of life, the Chinaman being subjected to but little mental stress.

Bronchial catarrh is not uncommon, and occasionally there is a little streaking of blood in the sputum. This does not seem to be of much importance, and cases which present it seem to make as good recoveries as the others. Owing no doubt to the less highly developed sense of hearing, the slight deafness which often is present in European patients does not seem to be present in the native, at least not to a sufficient extent to make the sign either a help in diagnosis or an inconvenience to the patient.

(3) Do typhoid fever and malarial fever run concurrently in the same patient?

As the result of my investigations I have come to the following conclusions, which agree in the main with those of most of the authorities on tropical diseases:—

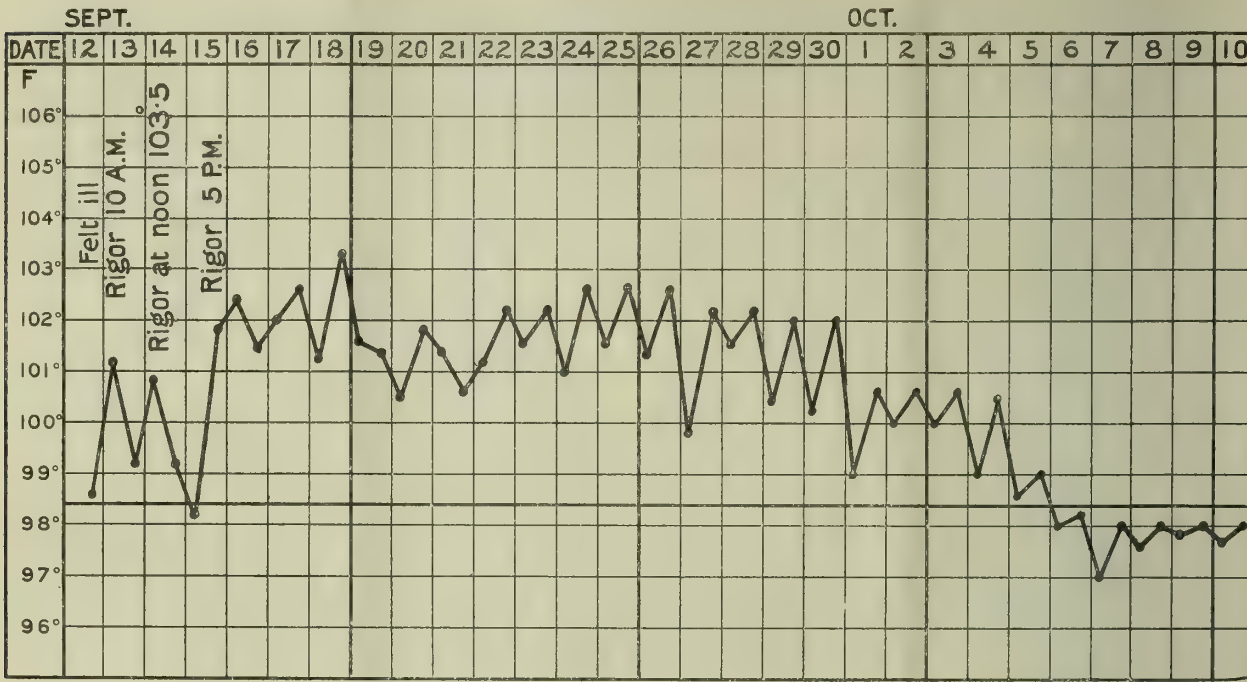
(*a*) It is *possible* for the two diseases to run concurrently throughout, but it is very rare and I have only met with one undoubted case.

The patient was one of the pastors of the native Church, and I was called to him towards the end of the second week of his attack. His blood gave Widal's reaction readily and also contained numbers of æstivo-autumnal parasites of malignant tertian type. His illness had begun with high fever and a sharp rigor, followed by a hot stage and imperfect sweating. Since that time he had had continuous fever with rigors at irregular intervals, but never less than one in thirty hours, and occasional attempts at sweating. He was much depressed and nauseated, and very constipated. Heavy doses of quinine and phenacetin checked the malaria, and there were no more rigors; but the typhoid ran a perfectly normal course, the temperature descending in the usual way.

(*b*) But the *usual* rule may be stated as follows: If the patient has been in good health and not exposed to adverse influences, and has not had a recent attack of malarial fever, the temperature will rise as it does at home and there will be no manifestation of malarial fever.

If, on the other hand, the patient, who is most probably already infected with the plasmodium, as a vast number of the natives in this region are, is exposed to cold or wet, or has to work under a broiling sun, or is freshly infected during the incubation stage of typhoid,

I.



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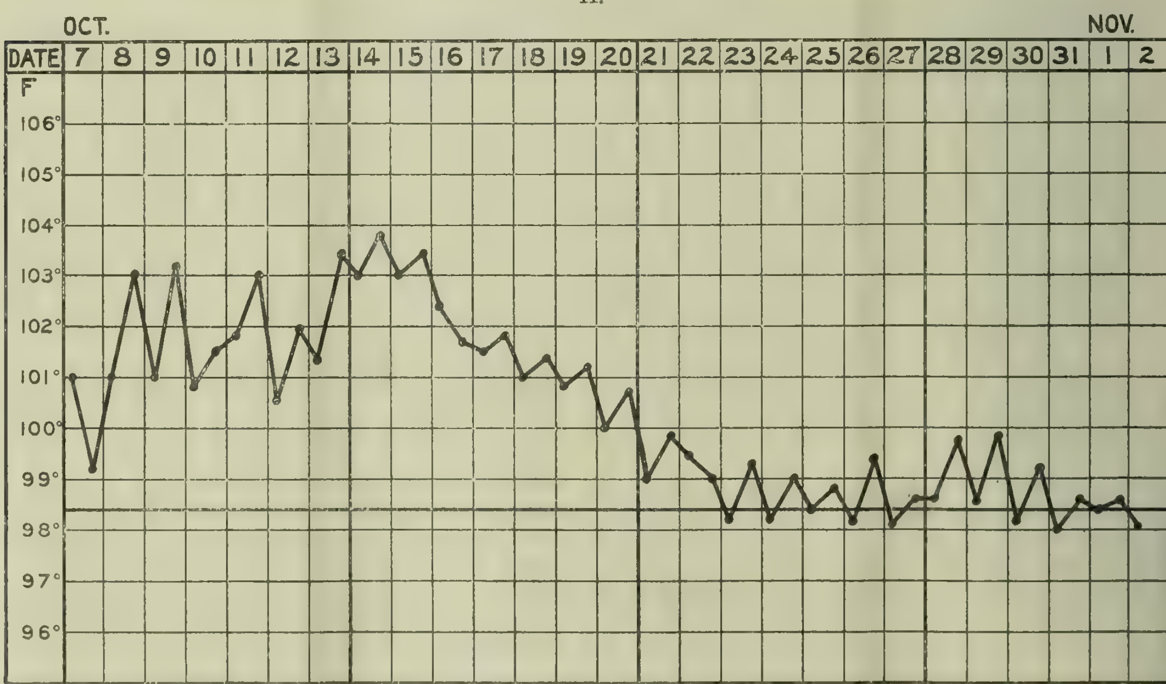

then the latter disease will commence with a sharp malarial attack, very likely of the quotidian type.

For two or three days the temperature may descend to normal, but—and this point is a valuable help—the patient is depressed and ill, quite unlike his condition during the remission of an ordinary malarial attack. As the case advances the malarial element ceases of its own accord, to probably recommence on the fall of the fever due to the typhoid, and in any case this form is easily arrested with quinine.

Here is one of my own hospital coolies who, as stated before, became infected from the stools of a patient. The fever began in the usual way, and there were no malarial manifestations. He was infected from the first of the cases I have quoted as illustrative, and the temperature charts of these two coolies are appended herewith.

In the cases above alluded to there is no difficulty in making out the malarial parasites in the blood, and their disappearance from the peripheral circulation during the course of the disease.

Let me quote some illustrative cases. Here is a man, a coolie in mission employ, who during his incubation period has to trim borders, and turn over some old ground in the heat of the day. His attack begins with four days' apparent malarial fever with quotidian rigors, and the presence of a small pigmented plasmodium in the blood.

Here is a woman who during the incubation period does a heavy day's washing, and gets drenched with rain during the course of the day. She has a week of rigors at regular periods, the temperature descending to normal in the intervals. Then it becomes continuous and high, and she passes through the last two weeks of an attack of typhoid.

On the other hand, here is a boy who had been admitted to hospital for lateral lithotomy, being operated upon two days after admission. He is kept under supervision, well fed and cared for. A week after operation, the temperature in the meantime having been practically normal, his temperature slowly rose in the typical manner and he had an uncomplicated attack of typhoid fever.

(4) Is the mortality of typhoid the same as amongst meat-eating races. in cool climates, and is there any difference in the ultimate cause of death in these cases and in those specified above?

This question is an extremely difficult one to answer. The Chinese are full of their own notions, and occasionally precipitate a fatal result in this way. For instance, in one of my cases the friends insisted on removing a girl in the third week of typhoid because they did not think she would recover, thereby causing perforation and death in a few hours. The patients also will get hold of all kinds of indigestible food and devour this contrary to orders.

My own impression is that, *if proper care were taken*, the bill of mortality would be lower amongst the natives than amongst the Europeans, but I have not sufficient data to make a positive pronouncement on this point, and as will be seen, the actual percentage mortality amongst the natives is very high.

During the period over which my researches extend there have been 26 cases of typhoid amongst the small European population of Amoy, with 4 deaths, a percentage mortality of 15·4. During this period Dr. Otte, of the Amoy Hospital (to whom my best thanks are due for allowing me to see his cases and use the same for statistical purposes), and myself have seen 55 attacks of typhoid amongst the natives. All these have been clear attacks; *doubtful* cases in which Widal's test could not be performed being excluded. Among this number there were 11 deaths, a percentage mortality of 20.

The sexes of these patients were as detailed below:—Male 32, female 23.

The majority of the patients were under 30 years of age, the youngest 12, and the oldest 56.

The causes of death were: Perforation 3, septicæmia after miscarriage 2, toxæmia 6.

Two of the cases of death occurred in pregnant women. Both cases came into my hands far too late, and were profoundly septic; in both the abortion was incomplete and the placenta stinking.

It will be clearly seen from what I have said that part at least of the mortality bill is avoidable, and as the natives come to trust foreign methods more these cases may be saved.

Still, taking it at its best, it is clear that the disease is a serious one, widespread, and a standing menace to Europeans unless due care is taken. And it is not yet sufficiently recognised that to partake of salads made up with Chinese grown vegetables, and to drink of unprotected water, or of milk, *without efficient sterilisation or filtration at the hands of other than Chinese*, is to court disaster.

As the treatment to be adopted in a country like China differs somewhat from that prevailing in our own country, it will be well if we turn for a few minutes to this subject.

As to the reduction of temperature: my own cases have been treated by sponging when the temperature reached 104°; ice is unobtainable in my region, and so has not been used. Dr. Otte's cases have been treated by baths whenever the temperature rose above 103°, and certainly the patients seem to like this form of treatment. As to the ultimate results, they have been about the same, whether bathing were employed or not.

Constipation may be very troublesome. Chinese bear enemata badly and we hardly ever administer them. Our not infrequent practice is to administer a small dose of castor oil, if needed, even at the height of the illness. In some cases a grain of calomel daily secures the passage of a stool, and seems to preserve the tone of the bowel. If the patient is seen at the outset, I think it is wise to thoroughly clear out the bowel by a purgative, and in the Chinese, who are very often infested with worms, it is well to give a dose of santonin. This drug, followed by a saline next morning, serves to clear the bowel, and give one's patient a fair start.

As a routine treatment, salol, gr. 5, combined with a grain of quinine, is my usual prescription, and the quinine serves to prevent the cropping up of malarial symptoms.

If diarrhœa be troublesome then the following prescription often checks it:—

Salol	gr. 5.
Bismuthi Carb.	gr. 5.
Sodii Bicarb.	gr. 5.
Pulv. Ipecac. Co.	gr. 2.

M. Ft. pulv., ter die until diarrhœa is checked.

Other symptoms must be treated as they arise, after the usual methods.

The native does not take to European food, and often will not touch either cow's milk or beef tea, but I have found that there is one form of food one can always get them to take. Their staple food is rice, and this I direct them to boil an hour longer than usual, with the result that it becomes a pulp; to this is added a large spoonful of sweetened condensed milk, one spoonful to one of the ordinary native bowls, which holds about 10 ounces. The patient is allowed as much of this as he will take, and must take at least three

bowls a day. He is allowed nothing else till the temperature has been normal for a week. Strange to say, the patient never objects to the condensed milk.

Relapses are less common and usually the recovery is more complete and speedy than at home; but in a few cases weakness both of body and mind persists for a few months after the fever is well.

I have met with one case of what has been termed "paratyphoid fever." In this case the clinical symptoms were typical of a moderately severe attack of typhoid, but Widal's reaction was negative. The patient recovered.

To sum up: Typhoid fever is a disease which is endemic amongst the natives of this region; in its general signs and symptoms it conforms to the disease met with in Europe, and at the present time is attended by a not insignificant death-rate. The name typhomalarial fever is a misnomer which should be at once dropped, there being no specific fever of this type.

I have said nothing in this paper of the relation between double continued fever and typhoid, as I have only had the opportunity of closely studying one case, but it may be stated that malarial plasmodia were absent, Widal's reaction was decidedly negative, and the clinical symptoms were not those of typhoid fever.

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TROPICAL HYGIENE.

By W. J. Simpson, M.D., F.R.C.P.

Lecture III.—*Continued.*

Water Supplies.

(*Continued from p.* 174.)

The Maiche Automatic Water Steriliser is an apparatus somewhat on the same principle as the Forbes Water Steriliser, but not nearly so portable. It is useful, however, for hospitals and institutions in which it is desirable to purify the drinking and domestic water supply. A few of them were supplied in South Africa during the recent campaign. Fig. 1 is a sketch of Maiche's Steriliser, made use of in the Fort of Pietermaritzburg during the war, and which supplied 800 gallons a day of sterilised water to the married quarters. The steriliser was placed in a small closed tower, which was formerly used for stores. On the roof of the tower was a water tank, supplied with unpurified water, which was conveyed by a pipe through the roof to the cylinder of the steriliser in the tower. The cylinder being longitudinally chambered, the water flowed through one of the chambers, and was then conveyed to the vessel in which the water was heated by a kerosene lamp. The heated water was then conducted back to the top of the cylinder, and in passing down in a small spiral pipe lost its heat to the incoming water, so that on leaving the cylinder and reaching the receiving tank the water was cool and fit for drinking. From the receiving tank in the tower the sterilised water was conveyed by a pipe to a 100-gallon tank situated at a convenient place in the fort, where it could be drawn off by taps as required. The initial cost of the steriliser was £56, and in constant use it consumed five gallons of kerosene a week. The maintenance cost about 9d. a day for 800 to 1,000 gallons a day. The oil lamp was required to be filled night and morning. The door was then locked, and the steriliser was left to work automatically. A part of the apparatus is a valve in front of the steriliser, which regulates the flow according to the temperature attained; the higher the temperature the quicker being the flow, and the lower the temperature the slower the flow. If the temperature falls below 212° the flow stops until the temperature rises. The valve requires very little attention, having in this case only been regulated once in six months.

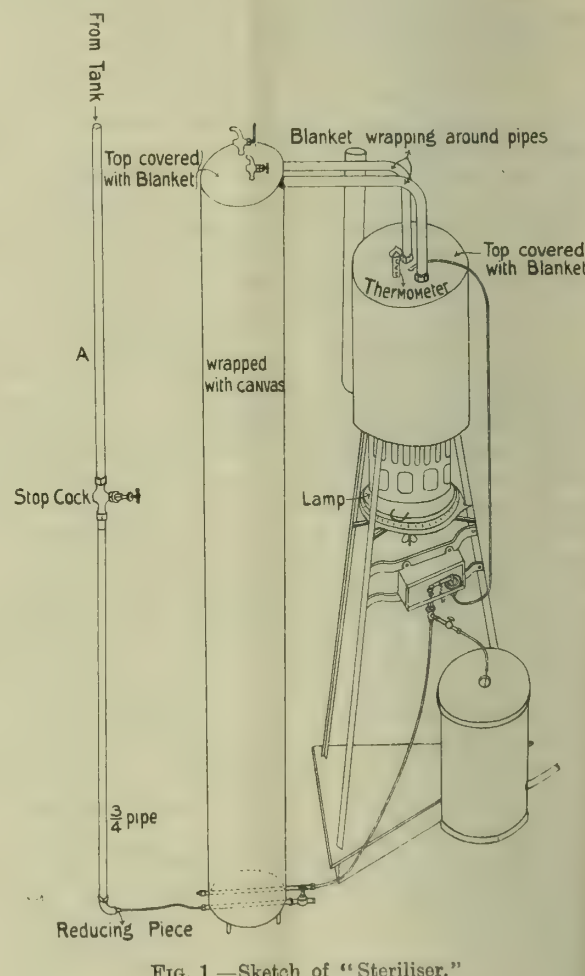

Fig. 1.—Sketch of "Steriliser."

Like the Forbes Steriliser, the Maiche retains the air of the water in solution, and accordingly the insipid taste that belongs to boiled water is wanting. Where neither of these apparatuses is at hand, but where steam is available, water may be sterilised in iron tanks by conveying the steam by pipe to the tanks and then afterwards allowing the water to cool. This method can be used on a large scale, and is adapted to large works where there is plenty of steam.

Filtration. Purification of water by filtration is adopted on a large scale for communities, and on a

small scale for households and individuals. The ordinary filters for public water supplies are usually in water-tight basins of 10 or more feet in depth, with sides built of masonry and bottoms cemented, or of brick cemented. In the floors are drains or channel ways for collection of the filtered water.

The filter itself is usually 5 or 6 feet in depth, and made up from the bottom of broken stone or pebbles, covered by a layer of coarse gravel, on which is placed a layer of coarse sand, and finally a layer of fine sand. The object of this arrangement is to prevent the fine sand from being carried through into the drains, and to so regulate the flow that there shall not be any currents or streams. The water rests several feet deep in the filter, and should not be allowed to flow through the filter at a greater rate than 4 inches an hour.

The filtration process is far from being a simple one, and has only recently been understood. At one time its action was thought to be mechanical, the sand separating out the suspended matter. Later, in addition to the screening properties, it was held that the oxygen in the filter acted on the organic matter, oxidising it. Recently it has been discovered that the oxygen of the air has by itself little action on organic matter in water without the aid of microbes, and that the purifying effect of a filter is mainly due to a membranous layer of microbes on or near the surface of the filter. On the surface of a sand filter there is a slimy deposit, composed of finely-divided clay with strong absorbent properties, and a gelatinous mass of intercepted bacilli and streptococci, micrococci, algæ and other bodies, and immediately below this film is a layer of nitrifying organisms.

It is this slimy layer on the sand which is the important factor in removing micro-organisms and the organic matter from the water. By the film the pathogenic micro-organisms are intercepted and destroyed, the organic matter is broken up into carbonic acid and ammonia, while by the nitrifying organisms the ammonia is resolved into nitrous and nitric acid.

The important points to be borne in mind with reference to sand filtration are that (1) there should be a thin layer of slime composed as above on the surface; (2) that this slime should not be disturbed during the process of filtration; and (3) that when the slime becomes too thick for the water to pass through it should be removed by slicing off. If a filter be employed for too long a period without cleansing there is a gradual growth of the surface bacteria through the filter.

The filter bed requires cleansing at certain periods, otherwise the slimy layer would completely choke up the filter and render it impermeable. The period that elapses between the cleansing depends on the quality of the water and the fineness of the sand.

The method of cleansing is to remove a thin layer of sand half an inch in thickness, and disturb the upper part of the remainder of the sand by a fork, so as to expose it to the air, after which it is smoothed over. This process is repeated until the upper fine sand is reduced to a foot in thickness, after which the whole of the filter is taken up and cleansed.

The formation of the slimy layer on the filter may be a matter of only a few hours, or it may take twenty-four hours or even longer. The water at this time that passes through the filter is not free from impurities, and arrangements should be made to allow it to run to waste. The filter bed should be filled from the top, and the water should be allowed to stand in it at a depth of 3 feet for at least twenty-four hours.

For efficient filtration the following conditions have been laid down by Koch: (1) The sand should not get below a foot in thickness; (2) the rate of flow through the filter should not be greater than 100 mm., or 3·95 inches, per hour, or not more than 200,000 gallons per acre per hour; for the more rapid the rate of flow through the filter the less is the efficiency of the filtration; (3) the quantity of microbes in the filtered water should not exceed 100 per cc. The mere provision of filters is not enough to secure good water; they must be well constructed, supervised, and frequently examined, especially in hot weather, in winter and in times of epidemics.

Care has to be taken that the fine film of bacteria, slimy algæ, and suspended matter is not broken. This may happen from the water being allowed to pass too rapidly through the filter, or from intense heat or cold on an exposed filter. Under these circumstances the filter is defective. In cold climates it is better for the filters to be covered over to prevent them from freezing; while in hot countries it is necessary in order that the water shall not be exposed too much to the sun, which renders the water warm, and at the same time favours the growth of algæ. The covering of the filters also excludes dust, which in some tropical countries is important. The storage tanks after the water is filtered should under every circumstance be covered over.

The very best sand filters cannot keep back all the micro-organisms in a water, but they possess the power of keeping back 98 to 99 per cent. of the bacteria. They have an enormous controlling power, as is seen by a comparison of the number of organisms in the water as discharged on the filters and the few that appear in the filtered water.

In Calcutta river water the germs were	250,000	per cc.
In settling tank	20,000	,,
In settling tank with algæ	100,000	,,
After filtration :—		
In clean settling tank	15	,,
In settling tank with algæ	250	,,

It will be seen that storage before filtration has also a very important effect on the reduction of micro-organisms.

There are two systems of sand filtration, the slow and the rapid, and in either system the filtration may be applied continuously or intermittently.

The slow sand filtration is the process which has been described, and is dependent on the gravitation of the water through the filter. There are conditions, however, in which the filtration through sand requires to be rapid, and for this purpose, the sand filters being usually limited in size, mechanical contrivances and pressure are brought into requisition. Mechanical filters are in greater use in America than elsewhere, and appear to be well suited for the muddy water derived from the

rivers there. In the mechanical filter an artificial film of an intercepting nature is obtained by the addition of some substance which will form a fine deposit on the surface of the sand. Sulphate of alumina in the proportion of a half to two grains per gallon of water is most commonly employed. The coagulant, which forms a fine gelatinous precipitate on the surface of the filter, removes the colour as well as the suspended matter of the water, and as much as 98 to 99 per cent. of the bacteria. These filters are in covered reservoirs, and are placed under pressure usually by the admission of compressed air, and are cleaned by a reversed action of the filter, with sometimes the admission of steam. Their rate of filtration is generally about fifty times greater than that of the ordinary gravity filter.

Filtration on a small scale for domestic purposes is now usually effected by two kinds of filters—the Pasteur-Chamberland and the Berkefeld. A few years ago there were on the market many kinds of filters, constructed of every variety of material; charcoal, asbestos, magnetic carbide, spongy iron, polarite, and silicated carbon were among the number. They have, however, gone out of fashion, having been found wanting in their action on bacteria. They do not sterilise the water or render it free from bacteria. It is because the Pasteur and Berkefeld possess this property that they have practically supplanted the others.

The Pasteur filtration is a purely empirical result, the uniform sterilising efficiency of the tubes being due to certain details of composition and manipulation in manufacture. It appears to depend on a surface attraction which the material exercises on protoplasm of microscopic dimensions. Air passed through the dry tubes emerges sterilised, and organisms smaller than the pores of the filter are arrested. Purification does not at first depend on the formation of a layer of slime as in sand filtration, for sterilisation begins immediately the tube is used, and occurs whatever may be the pressure of water. When steeped in water a Pasteur tube will not allow the passage of compressed air, and this circumstance enables a diagnostic test to be made of its bacterial soundness; or when a number of tubes communicate with a single receiver of the soundness of the whole filtering system, which for this purpose is immersed in water, so that a stream of bubbles will issue from a faulty point when compressed air is forced into the filtered water chamber.

The disadvantages of the filter are that is is not a gravitation filter but a pressure filter, requiring so much head of pressure before any considerable quantities can be obtained; and that in consequence of the ordinary river water of the Tropics being muddy or slimy, the filter becomes practically useless, for it rapidly gets a coating on its outside, which completely blocks up the filter and puts a stop to any water passing through, even under pressure. The same objections apply to the Berkefeld filter, with the additional one that it is more brittle than the Pasteur, and is not adapted for either rough transport or frequent cleansing.

The pressure difficulty is, as a rule, easily got over, for there are few places where a little ingenuity will not supply a sufficiency of pressure; and if not desirable to depend on this, there are numerous portable exhaust types in the market which can be adapted to every circumstance.

The readiness with which the filter—the Pasteur-Chamberland and Berkefeld—is blocked up is a much more serious affair, and leads sooner or later to the abandonment of its use. None of these kinds of filters will be of general utility in the Tropics unless, as part and parcel of their structure, there is a rough filter attached, which shall first clarify the water and remove the slime.

The Berkefeld filter is on the same principle as the Pasteur-Chamberland. It consists of diatomaceous earth, made into a thick instead of a thin cylinder, and allows of water being filtered more rapidly. The same remarks as to disadvantages of the Pasteur-Chamberland apply as much to the Berkefeld.

Hæmoglobinuria.

Emoglobinuria dei Malarica (The Hæmoglobinuria of Malaria), by Dr. De Blasi. *Gazetta degli ospedali e. delle cliniche*, 1903, No. 53.—The author states that hæmoglobinuria may occur either during the attack of malaria or as soon as the afebrile period sets in. He is of opinion that hæmoglobinuria is the result of the use of quinine.

Leprosy.

A Successful Attempt to Cultivate the "Bacillus Lepræ," by Van Houten. *Journ. of Path. and Bact.*, 1902, No. 8, p. 260.—The author of this article states that although numerous attempts have been made to cultivate the *Bacillus lepræ*, he is dubious as to whether the results were positive enough to prove that they were actually successful. In regard to his own researches, he is satisfied that he has succeeded in obtaining a pure culture of the bacillus. The methods adopted by this observer are somewhat different to those generally in vogue. He inoculates broth, prepared with fish and beef and rendered slightly alkaline, with leprous material. From this broth he is able to obtain subcultures in a similar mixture, and, after several cultivations, subcultures can be obtained in beef broth. The pure cultures exhibit the morphological characteristics of the *Bacillus lepræ*. The chief evidence, however, in the success of his efforts is afforded by the action of the leprous serum upon cultures of the organism. These bacilli, when mixed with diluted human serum, show the Pfeiffer-Bordet reaction. This reaction, which destroys the bacilli, occurs both with ordinary serum and with leprous serum, but the reaction is much more marked with leper serum than with the ordinary human serum. On the basis of this observation, Van Houten comes to the conclusion that his organism is the specific agent of leprosy.

Das Lepra Asyl Matunga in Bombay (The Leper Asylum Matunga in Bombay), by M. Oppenheim. *Wiener klin. Wochenschr.*, 1903, No. 21.—This interesting report furnishes an account of the arrangements and systems of the asylum, and specifies the various forms of leprosy met with in India.

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THE

Journal of Tropical Medicine

June 15, 1903.

THE CARE OF INVALIDS ON SHIPS.

An invalid in the Tropics "ordered home" is frequently loth to leave his more or less comfortable home or hospital to undergo the "hardships" an invalid is subjected to on board ship. He feels too ill to undertake the voyage, and may prefer to risk the chance of recovery in his tropical environment. The life of an invalid on board ship, even under the most advantageous circumstances, is not, and never can be, anything but most trying and uncomfortable; yet it is surely possible to alleviate in some measure his unenviable and in many cases dangerous position.

The Doctor.

We do not join in the universal condemnation of that much-maligned member of our profession, "the ship's doctor." It is the fashion to view him as a being of inferior medical calibre, and one only to be mentioned to be pitied or ridiculed. How unjust these statements are all medical men who have travelled are fully aware of, but the public have come to look upon service men, whether of the Army or Navy or of the merchant service, as bodies apart, and as belonging to a different professional species to the practitioners at home. The public services are doing all in their power to free their medical men from the opprobrium that has attached itself to these departments; but the "ship's doctor" is content to continue with the stigma which gossip has affixed to his calling. How this is to be removed we have pointed out more than once in these pages, and we would repeat that the main principle, to be aimed at, is that no medical man ought to be placed in charge of passengers or crews of ships sailing to and fro to tropical countries without a previous course of instruction in tropical diseases.

The Nurse.

There is another element, however, in the management and care of an invalid which requires to be brought prominently forward. The doctor without a nurse is like the engineer without his stokers, or the captain of the ship without his officers. It is not the province of the doctor to nurse patients, although on board ship he often has to undertake the duties of both medical attendant and nurse. If, however, he devotes almost his entire attention to one patient others must suffer, and he is therefore neglecting his proper duty. A nurse is, and must in future become, an essential part of a ship's company. In the meantime the patient is cared for by a friendly steward or stewardess; but "caring" for a patient is not nursing, and no untrained man or woman at the present day should be placed in such a position. The nurse in charge of patients from the Tropics, moreover, should have had experience of tropical ailments, and no nurse should be employed who cannot show by her certificates that she has had such train-

ing. In this country she can acquire experience of the kind at one of the hospitals of the Seamen's Hospital Society in London, and perhaps at one or two other centres, so that there is no lack of opportunity; should the nurse have had experience in a hospital in the Tropics so much the better. But we are convinced that a properly trained nurse will be required of all shipping companies carrying passengers in the near future.

The argument that the nurse's wage is a serious element to be considered cannot be allowed for a moment. At most it may amount to £40 a year, but even if it cost a much larger sum, her presence on board ship is a necessity to the travelling public, and the shipping companies will have to see to it that this public want is supplied; and they may rest assured that the company that provides a nurse on their ships will become a favourite line to travel by. Owners of ships and captains of ships will reply that they do not want invalids on their vessels, and were a nurse introduced the ships carrying them would be inundated with invalids. This is a form of argument that is played out. Few reforms have been obtained for seamen except by Act of Parliament; and even if ship-owners and boards of management are so shortsighted as to require legal compulsion in this matter we would warn them that even this may be imposed upon them. We understand that a movement in the direction of insisting upon trained nurses being carried on passenger ships is being instituted; and whilst cordially supporting that movement, we hope that the shipping companies likely to be affected will see it to be their duty to the public and the empire by doing all they can to smooth the pillows of those of our fellow-countrymen and countrywomen, who carry on the work of the empire in regions where disease is rife, and where it is well nigh impossible to live without contracting ailments which necessitate extreme care whilst the sufferers are being conveyed to their native shores. The public purse grants subsidies to not a few of our great shipping companies, and the public welfare demands that the lives of human beings be considered of more importance than the delivery of mails or the storage of merchandise.

Translation.

THE TECHNIQUE OF STAINING MALARIAL PARASITES.

By Dr. Josef Koreck (Hungary).

Translated from the German by P. Falcke.

The Romanowsky-Ziemann method of staining malaria parasites is undoubtedly the best. Yet Nocht, who first wrote on the subject (*Centralbl. für Bakt. Parasitenk und Infektionskrankheiten*, vol. xxiv., No. 22), complains of "the valuable, but too detailed and uncertain method," and he recommends a modification which precipitates no sediment. Recently Ruge ("Introduction to the Study of Malarial Diseases," Jena, Fischer, 1901) has again suggested a new modification of this method. I need not, however, describe it, as the method I have discovered is preferable from its simplicity. The circumstance that Ruge's solution requires heating and again cooling down every time before use has prevented me trying it.

For some years I have used for fixing, a watery solution containing 1 per cent. of chromic and 1 per cent. ac. acet. glac., into which the preparations are dipped for five seconds and afterwards well rinsed in water and alcohol. The ether-alcohol fixation is also good, but I was never satisfied with the alcohol fixation.

I believe that the principal fault of the original Ziemann stain is that his solution of methylene blue is too concentrated. I had but poor results when using a 1 per cent. solution of methylene blue (*Med. Höchst*).

If 1 ccm. of a 1 per cent. methylene blue solution is poured into a vessel and a 1 per cent. solution of eosin (A—G) be added—two drops (*i.e.*, 0·1 ccm.) at a time, the mixture well stirred after each addition, and one drop placed on a slide, these drops or streaks will form a varying scale of colour; on examination under the microscope it will be found that after the addition of a certain quantity of eosin the colour is no longer blue but violet, and the next is red. To attain this violet colour—the neutralisation—it is necessary to employ 0·8—0·9 ccm. of a 1 per cent. solution of eosin (A—G) to 1 per cent. methylene blue solution. As to the neutralisation of ready-prepared mixtures, these certainly stain most quickly, but they also form quite a host of coloured crystals, so that the beauty of the colour of the preparation can only be seen in places. If 0·1—0·2 or 0·3 ccm. or less eosin are used to each 1 ccm. of methylene blue there is less deposit, but the time taken to stain the preparations is correspondingly increased.

On May 1st Leonor Michaelis presented a report respecting a methylene blue eosin stain of blood preparations to the Society for International Medicine in Berlin. The mixture contains alcohol and acetones, and is sup-

posed to replace Ehrlich's triacid for the representation of the granulations of leucocytes. Stimulated by this communication I made experiments which proved that acetone may be used to stain malaria parasites, more especially their chromatin.

A 1 per cent. methylene blue med. solution, of which 1 ccm. had been neutralised by 0·9 eosin (A—G) could be used as follows: Methylene blue 1·0 + acetone 2·0 + eosin 0·9 to 1·7 stained in from five to fifteen minutes. When more eosin was used the time taken was longer; when less was used it was shorter. When the correct time had been reached a punctiform sediment formed.

This method, however, is not reliable, for a month later I tried to stain some preparations by it, and they were a failure. I found it was not worth while to find out the cause, for I discovered a much more reliable method: Distilled water ad 10·0 are added to 1·0 methylene blue + 2·0 acetone, and afterwards the eosin is added, 0·9 to 0·7. The addition of eosin in the neutralised condition is most reliable, but one and a half times as much (1·3—1·4) is applicable, although every stain is not so good with more eosin. The mixture is poured over the preparation, which should be inverted during the process.

With a definite methylene blue (*Med. Höchst*) solution, two months old, prepared according to Ziemann, I was able (on addition of 1·7 eosin) to stain blood-corpuscles lilac in twenty minutes, and nuclei of leucocytes a good violet; after a period of thirty-five minutes the blood corpuscles were eosin red, the chromatin was still more deeply stained, and at sixty minutes deposits of colour set in.

With another solution, one month old (again with the addition of 1·7 eosin) the chromatin was only slightly stained in twenty, thirty-five and sixty minutes. A methylene blue rectif. Erhlich solution also led to failure.

In one word, not only did different sorts, but even the same kind of methylene blue, gave unstable results. The maturing of the solutions is a factor that cannot be forgotten. I proved that warming the solutions weakened their power of staining and therefore prepared a cold solution as follows: 1·0 g. methylene blue was placed in a mortar and moistened with a little water, and then rubbed to a homogeneous cream; this is diluted with water and filtered, and the mortar and filter washed out with water until the water amounts to 100·0 ccm.

This solution yielded the neutral tint with methylene blue 1 : eosin 0·9; but mixed with acetone and water —as above—and 1·7 ccm. eosin, a sufficient colouring of the chromatin was not obtained in twenty, thirty-five or sixty minutes. The experiment, however, with the addition of only 0·9 ccm. eosin, shows that this solution only requires different treatment. In fifteen minutes the staining was complete, the central parts being only somewhat weak. Similarly *à la* Ziemann: Two methylene + 1·6 eosin yielded a good chromatin stain in thirty-five minutes. The maturing of the methylene blue solution has never been satisfactorily explained, notwithstanding all that has been written on the subject. I could not discover whether exclusion of the air or the effects of the atmosphere favoured this maturing. It may possibly be decomposition. Heating means sterilisation, and this consideration should teach us to prepare cold solutions. The above-mentioned cold solution improves considerably in seventeen days.

Ziemann's method, in the proportion of 1 methylene blue to 0·6 eosin, obtained a complete staining of the chromatin in ten minutes, and with acetone water and 0·9 eosin this result was obtained in five minutes.

It is known that by the addition of alkalines the power of methylene blue solutions to stain chromatin is increased. Usually the blood corpuscles, in these preparations, assume a bluish-violet tone, which renders the discovery of small parasites very difficult. On standing, this became deeper still, so that I always, *ex tempore*, added a 2 per cent. borax solution. The following mixture yielded a strong chromatin stain in twenty-five minutes, but the blood corpuscles were somewhat dark: 1 per cent. methylene blue, 1·0 + 2 per cent. borax, water 0·5 + distilled water ad 10·0 + 1 per cent. eosin (A—G) 1·2. The preparation becomes somewhat paler if plunged into weak eosin water several times, yet is is not satisfactory. By adding more eosin the stain becomes lighter and more reddish. Borax, methylene blue *à la* Ziemann (with the addition of eosin without dilution) gave unsatisfactory results.

I also tried lime-water and calcium carbonicat. precipit. As much as will go on the tip of a knife, shaken up with a 1 per cent. methylene blue solution, filtered, yielded good results *à la* Ziemann, but did not do with acetone. I also tried metals (*plumbum oxidatum* and *plumbum carbonicum* without success), and I found that soluble Credé's silver, called collargol, yielded by far the best results. I add 0·5 g. collargol to 100·0 ccm. of 1 per cent. methylene blue and shake all well up; I then filter after a few hours. This solution can, however, be used unfiltered if care is exercised not to shake up the sediment. This arg. methylene blue was neutralised in the proportion of 1 methylene : eosin 0·8, and for staining *à la* Ziemann in the proportion of 1 methyene to 0·6 eosin poured over it, is more practical than the best Ziemann solution. The stain is excellent in fifteen minutes, and in older solutions a shorter time suffices. When 1 ccm. of arg. methylene blue is diluted with distilled water ad 10·0, and then 0·6—0·7 ccm. 1 per cent. eosin (A—G) is added, double time is required for staining. With the addition of acetone the following procedure is recommended: Arg. meth. blue 1·0 + acet. 2·0 + distilled water ad 10·0 + eosin 0·8—1·5. Eosin (0·8) is also the most reliable in this method. Time required: half an hour—less in older solutions. When sediments occur the time is to be lessened, or a fresh solution is to be prepared.—*Deutsche Medizinische Wochenschrift*, April 23, 1903.

Summer-Fall Fevers.—Mr. Krauss (*Amer. Med. Assoc.*, May 5th, 1903), states that some of the summer-fall fevers were typhoid, some were malarial and a few of them were neither, but the writer was opposed to the belief in an x-fever.

Reprint.

FILARIA PERSTANS.

By George C. Low, M.A., M.B., C.M.

Medical Superintendent and Tutor, London School of Tropical Medicine.

(*Continued from page* 182.)

The Parental or Adult Forms.

The parental forms of the embryonic *Filaria perstans*, first discovered by Daniels in British Guiana, resemble fine coiled threads, the males being shorter and finer than the females. In both sexes the head is club-shaped; the neck, narrower than the head, joins the body, which tapers somewhat as it approaches the tail, the latter organ having the cuticle thickened over it, forming two triangular appendages.

A well-marked, musculo-cutaneous, non-striated layer encloses the body cavity, in which the viscera and generative organs are placed. The alimentary canal begins with a simple circular mouth, and extends almost throughout the entire length of the worm, ending on the concavity of the curve formed by the tail.

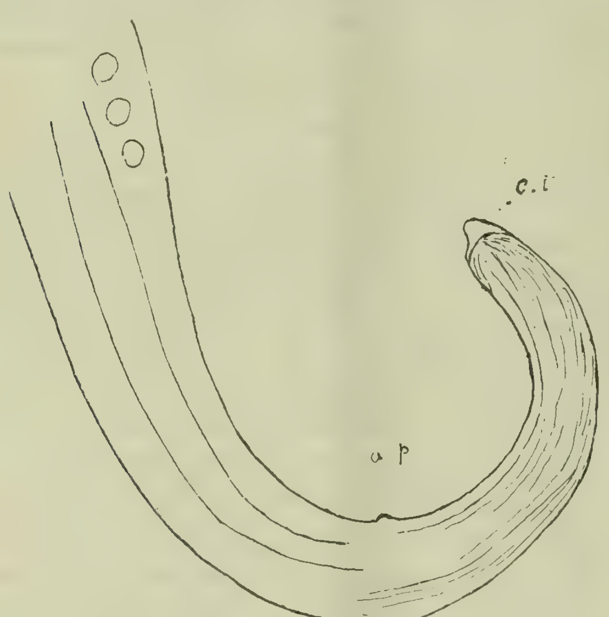

Fig 1.—Tail of *Filaria perstans* ♂ (slightly diagrammatic), × 525. *a p*, anal papillæ; *c t*, cuticular thickening at tip of tail, one of the triangular appendages only seen.

In the female the anus opens at the apex of a slight bulge or papillæ on the cuticle; in the male it opens at the general level of the outside of the body, but has four pairs of papillæ placed in front of it (pre-anal papillæ) and one pair behind it (post-anal papillæ), and two unequal spicules may sometimes be seen protruding from the orifice. The two uterine tubes almost completely fill up the body cavity of the female, these being packed with eggs posteriorly and with embryos anteriorly, the latter escaping into the vagina, which unite and open externally some distance behind the head.

The adults inhabit the connective tissues at the base of the mesentery and may be found readily if some time is expended on the research. The best method to adopt is to remove the whole of the mesentery from the intestines and the tissues at its base *en bloc*, and then to place them in 2 per cent. formalin. This is

Fig. 2.—Tail of *Filaria perstans* ♂ (slightly diagrammatic), × 525. *a p*, anal papillæ; tip of tail not seen.

then dissected piecemeal at one's leisure, and with good eyes a lens is unnecessary. The worms when found may be placed in 2 per cent. formalin, and after measuring them, they should be mounted for permanent preparation with or without staining in glycerine jelly.

TABLE III.

Measurements of an Adult Female and Male *Filaria perstans* from Uganda.

	♀	♂
Length	50 mm.	34 mm.
Greatest thickness ...	0·160 mm.	0·104 mm.
Diameter of head... ...	0·080 mm.	0·064 mm.
Diameter of neck... ...	0·072 mm.	0·054 mm.
Distance from head of vaginal orifice	1·22 mm.	
Distance of commencement of uterus from head	1·60 mm.	
Distance of end of uterus from tail	0·600 mm.	
Distance of anus from tail...	0·160 mm.	0·120 mm.
Anal papillæ	None	Four pairs of pre-anal papillæ, one pair of posterior.
Termination of tail ...	Cuticle thickened to form two triangular appendages	Cuticle thickened to form two triangular appendages.

The Intermediate Host.

Analogy leads one to suppose that the embryo filariæ must be sucked out of the blood by some insect in which they may undergo the metamorphosis necessary to enable them to become once more adult worms, and the peculiar distribution of the parasite and its association with dense tropical forests suggests some insect with a similar distribution. To determine the point

a series of experiments were conducted with many different mosquitoes and other insects, the procedure adopted being to catch the insects in infected huts or to rear them from larvæ and then allow them to bite infected persons.

Subsequent dissections were then made, but with one exception all the results were entirely negative. In one isolated instance two forms, showing what has been described as a sausage shape, were seen in the thoracic muscle of *Tæniorhynchus fuscopennatus* (Theobald), and this is interesting, because Vincent and myself, when working in Trinidad at the intermediate host of *Filaria Demarquaii*, found in several instances sausage-stage forms in the thoracic muscles of *Stegomyia fasciata* reared from larvæ and fed on infected cases. Those, however, never developed further, and in dissections at later dates entirely disappeared.

The fact, however, of finding forms of *perstans* and *Demarquaii* in the thoracic muscles showing this stage of development, suggests at once that if one could find the proper efficient host the embryos would migrate to that same region, and undergo a similar development to that of *Filaria nocturna* in *Culex fatigans*.

Some of the other insects experimented on, all of which, however, gave negative results, were *Stethomyia nimbus*, of the subfamily of the *Anophelinæ*, *Anopheles argyrotarsis*, *Culex fatigans*, *Culex atratus*, *Janthinonsoma musica*, *Culex viridus*, *Culex luteolateralis*, *Culex quasigelidus*, *Anopheles costalis*, *Anopheles funestus*, *Panoplites Africanus vel uniformis*, *Uranotænia cæruleocephala*, *Pulex irritans*, *Pulex penetrans* (chigger), *Pediculus capitis*, and *Pediculus vestimentorum*.

Pathology.

Filaria perstans, like *Filaria Demarquaii*, gives rise to no pathological symptoms, the position of the worms in the connective tissues of the mesentery apparently causing no harm. A differential leucocyte count in a series of eight cases showed that five had no eosinophilia, even though one of those had also bilharzial disease—a very common complaint in Uganda. The other three—two children, one a young adult—showed an eosinophile percentage of 15, 16 and 19 respectively; but as their fæces exhibited the ova of ankylostomata, tricocephalus, and *Ascaris lumbricoides*, it is difficult to decide to which of those the condition was due.

The idea that sleeping sickness was associated with *Filaria perstans* is disproved by the fact that in British Guiana, where this parasite is common, there is no sleeping sickness, and *vice versâ* in Kavirondo, where the latter disease is rife, there are no filariæ.

Reviews.

A Manual of Plague. By Wm. Ernest Jennings, M.B., C.M., Major I.M.S., with an Introduction by Surg.-Genl. G. Bainbridge, I.M.S. London: Rebman, Limited. Fifteen plates, pp. 254. Price 8s. net.

Major Jennings has written a book on plague which is at once comprehensive, scientifically accurate, and thoroughly up to date. His long experience of plague in India, and as Chief Medical Officer for plague operations in the Bombay Presidency, has placed him in a position to speak and write with authority, and we welcome his "Manual of Plague" as the first systematic account of the disease since the recrudescence of plague appeared, in 1894, in Hong Kong. The text is divided into ten chapters, the two last being devoted to the questions of the suppression and the prevention of plague. The book is well printed, clearly written, and the descriptions are accurate.

The workers at plague will turn with greatest interest to the chapters on the means of suppressing the disease described by Major Jennings; and although there is nothing new in the methods recommended, yet a clear exposition of the various procedures in vogue will prove welcome reading.

The entrance of the plague bacillus by way of the skin and the mucous membrane of the respiratory tract is lucidly described; and the possibility of entrance by the conjunctiva, the genital tract and the mucous surfaces of the alimentary canal pointed out. The mode of exit is stated to be "by some of the secretions and excretions; by its own products, such as *débris* from disintegrating buboes, contents of blebs or other skin eruptions, sputa, &c., or in blood by hæmorrhages from any part." Rats are looked upon as the chief offenders in the spread of plague; but mice, squirrels, birds, domestic animals, suctorial and parasitic insects, ants, flies and fleas, are also held to be carriers of plague bacilli. The efficacy of Haffkine's vaccine is insisted upon, and the usefulness of the various curative sera advocated.

A useful appendix containing forms of report for guidance of medical officers should prove useful.

We congratulate the author upon the excellence of the text and the publishers upon the handsome appearance of the volume.

New Drugs, &c.

Saloquinine.—Messrs. Zimmer and Co., of Frankfort-on-Maine, have produced a combination of salicylic acid and quinine, which is stated to combine the action of salicin and quinine, and to enhance the periodic, antipyretic and analgesic properties of ordinary quinine. Dr. Cook, of Chicago, has administered saloquinine in 15-grain doses every four hours with beneficial results.—*Memph. Med. Month.*, October, 1902.

Notes and News.

A correspondent in Lourenço Marques informs us that there has been no serious cases of malaria in the locality for two years; he attributes this to the unusual dryness of the weather. This observation is quite consistent with the mosquito-malaria theory—the dryness of the season no doubt accounting for the absence of mosquitoes and their larvæ.

Prescriptions.

Diarrhœa Mixture without Opium.

℞. Tr. camphor .. .. ʒi.
Tr. capsici .. .. ʒss.
Tr. lavandul. comp. .. .. ʒij.
Spts. vin. gal. .. .. q.s. ad ℥ij.
M.S.: Teaspoonful every two or three hours.

—Rex.

Treatment of Chronic Summer Diarrhœa.

℞. Bismuthi subgallati .. .. .. gr. xxiv.—xxvi.
Pulv. opii .. .. .. gr. ss.
Pepsin. pulv. .. .. .. gr. vi.—xij.
M. Trit. in pulv. No. xii. S.: One every four hours, alternating with the following:—
℞. Hydrarg. chlor. mitis .. .. gr. ss.
Cerii oxalat. .. .. .. gr. ij.
Sacchar. alb. .. .. .. q.s.
M. Trit. in pulv. No. xii. S.: One every four hours.

—*Med. Times and Hosp. Gazette*, May 2nd, 1903.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis.

Prevalence of Ankylostoma in the United States.—At the meeting of the American Medical Association, May 5th, 1903, Dr. A. J. Smith described the distribution of uncinariasis in the United States. He found eight persons suffering from the disease out of eighty-eight supposed healthy persons examined in Texas. He also compared the *Uncinarius duodenalis* (man) and the *U. stenocephala* (dog), and drew attention to the distribution of the two worms in the same localities.

Beri-beri.

At the meeting of the Medical Association at Tokio, held at the end of last year, Dr. Mitsuda presented an interesting paper on kakké. In one case of the disease he observed facial paralysis, and in another paralysis of the abdominal muscles and of the bladder was present. In 66 per cent. of kakké patients traces of albumen were found in the urine, and casts were present in the urine in 80 per cent.

Diarrhœa.

Bacillus Shiga in an Epidemic of Diarrhœa, by Dr. Strong. *Boston Medical Journal*, 1903.—Dr. Strong reports an epidemic of diarrhœa in which ileocolitis was a common feature, and positive evidence demonstrated the fact that in four such cases the *Bacillus Shiga* was present. The author suggests that there must have been a common cause to account for the unusually large number of cases, and concludes by pointing out that if it is correct to infer that some simple diarrhœas passed into infectious diarrhœa, and that the infectious diarrhœas were either fermental or ileocolitis, according to the place of lodgment of the irritating matter, then the *Bacillus Shiga* might be the common cause sought for.

Hæmoglobinuria, see page 194.

Leprosy, see page 194.

Malaria.

Mosquitoes and Malaria.—R. L. Roy, in *Indian Engineering*, May 9th, 1903, remarks that: My experience inclines me to favour the mosquito theory. It is well known that gunpowder is manufactured at Ishapur, a station on the E. B. S. R. Before this manufacture was started the general health of the place was good, but since it has been established the public health is much affected, chiefly by fever. The *anahar* plant (*Cystisus cajan*) is one of the principal ingredients in the manufacture of gunpowder. This is steeped in the big khal at Ishapur, and during the fermenting stage mosquitoes are generated very plentifully. Ishapur has in consequence been decimated by malarious fevers and the deaths are traced mostly to mosquito poison.

Plague.

The Mode of Entry of Plague Infection into the Human Body, by Lieut.-Col. H. E. Deane, R.A.M.C. (late Special Plague Med. Off., Calcutta). *The Indian Medical Gazette*, March, 1903.—The author, in an exhaustive and scientific paper on plague, gives his experience as to the manner and mode in which the plague bacillus gains entrance into the human organism, and he summarises the conclusions he has arrived at as follows: When abrasions are found in a patient suffering from plague, there is an entire absence of any sign to render it probable that they were the points of inoculation.

In a comparatively small proportion of plague cases skin lesions are observed, which, when appearing early in the course of the disease, are assumed to be points of entry of the virus; but the evidence of such a mode of infection is inconclusive, and the skin manifestations can be more satisfactorily accounted for by considering them as evidence of general blood infection.

Plague is contracted by inhalation of the virus, and the different symptoms presented by different patients depend on the individual constitution mostly, but may partly be due to the quantity of virus absorbed. Infection through the respiratory organs is borne out by the course taken by the disease, and its virulence in damp dark places, void of ventilation.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

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The Journal of Tropical Medicine.

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ORIGINAL COMMUNICATIONS.

EDITORIAL.

Original Communications.

SLEEPING SICKNESS IN THE LIGHT OF RECENT KNOWLEDGE.

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For over a century the mysterious sleeping sickness of Africa has been known to Europeans. It lurked in the back-country of the West Coast, between the Senegal and the Quanza, and, at the time of the slave trade, hundreds of negroes, raided from the interior, died of it on board transport ships, or in the plantations of the Antilles. But the disease did not give rise to any apprehension; it was believed to be strictly confined to the negro race, it did not spread in the places to which it was imported, and was universally regarded as a peculiar form of nostalgia.

Quite recently, possibly in consequence of the great commercial stir which the advent of the white man has created amongst the native tribes of Tropical Africa, sleeping sickness has begun to spread very widely, and has assumed a fearful importance in the pathology of the Dark Continent. Within the last few years it has extended southward throughout Angola, it has spread up the Niger and the Congo, and, proceeding along the new trade routes opened up by Europeans, it has suddenly appeared in East Central Africa, invading the Upper Nile and the shores and islands of the equatorial lakes. In Northern Angola, on the upper Congo, in certain districts of Uganda, its ravages have already been appalling. In many places entire villages have been depopulated. In the Busogo province alone 30,000 natives have succumbed within the last three years.

The appearance of sleeping sickness in the very heart of Africa, its steady, widening progress, call for very serious consideration and for immediate action. The disease is quite likely to follow the Nile and menace Egypt, or, reaching the East Coast, it may possibly find its way into India. However, it is not merely its tendency to spread which brings sleeping sickness so forcibly before us, but its terrible, inexorable deadliness. The sleeping sickness of Africa is invariably fatal.

Heretofore, sleeping sickness has been looked upon as a disease of the negro race exclusively, but a number of cases have been reported in half-breeds, and two or three doubtful cases in Europeans. So far the cases amongst Europeans have been disbelieved, chiefly on account of erroneous *à priori* arguments. Latterly, our ideas concerning the relation between race and disease have been totally changed. We know, now, that there are no purely ethnic diseases. At one time it was believed that the dark races were far more liable to elephantiasis than the white, now, we know that when Europeans are placed exactly in the same conditions as the natives they are quite as liable to acquire it. I have no doubt the same is the case in sleeping sickness.

Symptoms.

The symptoms of sleeping sickness are fairly well known. Clarke,[1] Dangaix,[2] Nicolas,[3] Santelli,[4] Guérin,[5] McCarthy,[6] Corre,[7] Abblart,[8] Forbes,[9] Bettencourt,[10] Cook[11] and Hodges[12] have given us excellent descriptions of the disease as it occurs in various parts of Africa, and Mackenzie[13] and Manson[14] have very carefully described three cases of the disease in Congo natives brought over to England for the express purpose of accurate investigation. Two of the latter cases I had the opportunity of watching myself.

A striking feature in sleeping sickness is the long duration of its incubation period. At times, the disease in its characteristic somnolent stage may not manifest

itself until two, three, or five years after the patient has left the endemic centres. A case occurred in England in a Congo boy who had resided in this country for three years without showing any particular sign of unhealthiness. During the time of the slave trade the disease was not uncommon in the West Indies among the imported slaves, breaking out long after they had left Africa. According to Corre,[7] the natives of Gorée (Senegambia), when obliged to dwell for a time within the endemic centres of sleeping sickness, do not consider themselves quite safe until seven years after their return.

The long incubation period of sleeping sickness may be compared to that of hydrophobia, a disease which offers other points of likeness. The incubation period of hydrophobia may be prolonged for one or more years, but its average length is from six weeks to two months. Possibly, in sleeping sickness, the average length of the incubation period does not exceed a few months.

After the onset of the characteristic symptoms the disease may run a very rapid course. As a rule it lasts from three to four months, but a large proportion of cases have been known to continue for twelve months or even longer. Not infrequently the fatal issue is hastened by inanition or by an intercurrent disease such as dysentery or pneumonia.

The drowsy stage creeps on slowly and insidiously. The patient is languid, taciturn, slow, dejected; his customary spirit and activity are gone, he grows dull and listless. He has a feeling of weight or even pain in the head, and occasionally suffers from giddiness. He is unable to carry on his work on account of a great, overpowering lassitude. He may fall asleep while at work, while at his amusements, and even while he is eating. With the progress of the disease his gait becomes unsteady and tottering, like that of a decrepit old man. He is found lying in the sun, in a state of drowsiness, with the eyes half closed and the limbs extended. He can easily be roused, and replies to questions intelligently, but slowly and in monosyllables. If he attempts to rise he does so with difficulty, and his movements are accompanied by muscular tremor. There may be some puffiness about the face and a characteristic drooping of the upper eyelids, which give the patient a peculiar heavy expression. The skin has lost its glossiness and looks dry, ash-coloured and scurfy. A closer inspection will almost invariably reveal a papulo-vesicular eruption, especially marked on the front of the chest, over the abdomen, and on the inner surface of the thighs. This eruption gives rise to severe itching, and the patient is nearly always scratching some part of his body. In a large majority of cases the lymphatic glands of the head and neck are appreciably enlarged. Very often other groups of deep and superficial glands are swollen. The swollen glands show no tendency to suppurate. As a rule the patient is well nourished, and his appetite is fair. He may be liable to diarrhœa or to constipation. His tongue, when protruded, is characteristically tremulous. We have no very definite knowledge of the temperature in sleeping sickness. In some instances the disease is afebrile; the surface temperature may even be subnormal. As a rule there seem to be irregular attacks of fever during the course of the disease, the temperature varying from 100° to 103° F. Corre speaks of a regular evening rise. A day or two before death it may fall below normal. Sometimes there is hyperpyrexia.

After a time the drowsiness becomes more marked, the patient appears to be always asleep, and it becomes difficult to rouse him. He does not reply readily to questions, but the replies, when made, are correct and rational. He takes food when it is given to him, but unless constantly prompted he will invariably relapse into somnolence whilst conveying food to his mouth, or with the half-chewed victuals in his cheek. This stage is occasionally attended with remissions, sometimes sudden and sometimes gradual—deceitful appearances of amendment—but invariably it relapses, and these fallacious symptoms of improvement may occur more than once.

At length the muscular debility becomes excessive, the drowsiness almost continuous, and the patient becomes greatly emaciated. His limbs are agitated with tremors or become powerless and contracted, the corneæ may become opaque, bedsores form upon the sacrum, the ilia and the shoulders, the lips swell, and saliva dribbles from the mouth; he passes the fæces and urine involuntarily, and dies occasionally in convulsions, but oftener without a struggle. These are the broad outlines of sleeping sickness.

Morbid Anatomy.

The coarse anatomical features of sleeping sickness were described many years ago by Clarke,[1] Dangaix,[2] Gore,[15] Guérin,[5] and others. In 1898, Regis and Gaid[16] published a detailed microscopical examination, and attributed the symptoms of sleeping sickness to a diffuse meningo-encephalitis, but their observations referred to a single case in the region of Timbuctoo. In 1900, Mott[17] published the changes he had found in the central nervous system of two cases of the disease, and remarked that sleeping sickness is due "to a poison, of micro-parasitic or other source, which affects especially the lymphatic system, and in particular that portion of it pertaining to the central nervous system." Mott's excellent observations were confirmed by the Portuguese Commissioners in 1901, and by Warrington[18] in 1902.

The chief characteristics after death from sleeping sickness are: general emaciation, enlargement of the lymphatic glands, slight opacity and thickening of the pia-arachnoid, and serous effusion into the meshes of the pia mater or into the ventricles. The microscope reveals an intense chronic meningo-encephalo-myelitis. The emaciation is very marked in certain cases, the enlargement of the lymph glands is constant, and may be noticed in the cervical, axillary, mesenteric, and inguinal groups. In the cerebro-spinal system the macroscopical changes are seldom marked. In most cases there is only a slight opacity of the pia-arachnoid over the convexities and some serous exudation in the subarachnoidal space. In some rapid cases the exudate may be considerable in amount. As a rule it is some-

what turbid, but never purulent. The vessels of the brain do not show any appreciable abnormality, but there may be a marked congestion of the arteries and veins of the dura mater. The cerebro-spinal fluid may be slightly turbid, but seldom in excess. The ventricles are never dilated and the ependyma is not granular. The brain substance is of normal consistence and the convolutions are neither flattened nor wasted. *Puncta cruenta* are rarely marked in the cut surface of the cerebrum. The medulla shows to the naked eye marked congestion of the vessels. In one of Mott's cases the roots of the cauda equina were surrounded by a gelatinous yellow deposit.

The microscope shows the pia-arachnoid infiltrated with small round nucleated cells; the inflammation is seen throughout the whole central nervous system, but especially in the medulla and at the base of the brain. It can be traced along the blood-vessels and septa into the substance of the nervous system. The perivascular lymphatics around both large and small vessels are crowded with these lymphocytes. The cells of the cerebral cortex show a normal outline, but scattered through the substance, especially in the pericellular spaces, are the small round nucleated cells.

Fig. 1.

The enlargement of the lymph glands throughout the body, and the enormous accumulation of lymphocytes within the perivascular lymphatics of the cerebro-spinal system, indicate that the specific agent of sleeping sickness is essentially a parasite of the lymphatics, but that it is capable of damaging the nervous elements, either by mechanical action, or, possibly, by elaborating a special toxine.

Epidemiology.

The epidemiology of sleeping sickness is as yet very imperfectly known, but it presents several remarkable peculiarities. The disease is strictly connected with water. It prevails along rivers and streams or on the shores of lakes. Several people have remarked that its endemic centres correspond as a rule with the worst malaria stations, and Corre lays special stress on the paludal nature of the sleeping sickness centres of Joal and Portudal in Senegambia. In Uganda, where it has only just appeared, it is confined to the northern shores of Lake Victoria Nyanza and to the adjacent islands. Another characteristic feature is its patchy distribution. The disease is not generally diffused throughout a river valley or other endemic district, but affects particular foci, clings to particular villages, and is not observed in places near by. Corre has frequently remarked that sleeping sickness may attach itself to a particular house or to a particular group of houses. It may suddenly appear in villages hitherto immune and cling to the place for years. As to season, the only information is that of Corre, who states that in Senegambia a number of patients believed they had contracted the disease during the rainy season. Neither age nor sex seems to have any special influence. Sleeping sickness may make its appearance at any epoch of life, but it is more commonly found between the ages of 12 and 20 years. It is very rare at an earlier age than 3 years, but this does not prove a protective influence of the period of lactation as conjectured by Ziemann and others. Males and females are equally affected.

Old Theories.

Various theories have been put forward at different times to account for this strange and formidable disease. Some believed it to be a kind of nostalgia intensified by the ill-treatment suffered at the hands of slave-dealers and planters. Other equally irrelevant theories are those which ascribe the disease to malaria, to sunstroke, to sorcery, to the immoderate drinking of palm-wine, or to the smoking of Indian hemp.

Corre, in his first paper on sleeping sickness, conjectured that the disease might be a kind of food poisoning analogous to ergotism and lathyrism, but later he put it down to scrofula on account of the frequent occurrence of glandular swellings. Calmette, in 1888,[19] compared the disease to pellagra, and Ziemann[20] revived again last year the food-intoxication theory by ascribing sleeping sickness to the eating of raw or unsuitably prepared manioc. Ziemann says that he was led to this theory by a previous study of pellagra and beri-beri, which, he affirms, are known to be diseases of intoxication. But so far no one has actually proved that pellagra is caused by some specific toxic substance contained normally in maize, neither has anyone proved that beri-beri is due to the consumption of rice. Both maize and rice are perfectly healthy foods under ordinary conditions, and whatever their part may be in the natural history of pellagra and beri-beri, they certainly do not stand in the direct relation of cause and effect. Like many other food-plants now extensively cultivated in West Africa, the bitter cassava (*Manihot utilissima*) and the sweet cassava (*Manihot aipi*) were imported from South America. The areas of their cultivation and consumption in Africa do not in any way coincide with the geographical distribution of sleeping sickness. Another reason against the food theory is the occur-

rence of the disease among negroes far removed from the endemic centres, as in the West Indies and in Europe.

BACTERIA.

Various kinds of bacteria have been described in cases of sleeping sickness and claimed to be the specific agents of the disease. In 1897, Cagigal and Lepierre[21] found a bacillus in the blood of a case of sleeping sickness from Angola, and claimed that it was the cause of the disease. They stated that by inoculating rabbits with cultures of this bacterium they produced a disease resembling sleeping sickness and yielding the characteristic organism. Brault and Lapin,[22] who had a culture of the bacillus sent to them, were unable to confirm these observations.

In 1899, Marchoux[23] suggested that *Fränkel's diplococcus* might be the cause of sleeping sickness. He made the autopsy of one case of sleeping sickness at Saint Louis (Senegal), and found the pneumococcus on the pericardium, but was unable to detect its presence within the cerebro-spinal system. Pneumonia was very prevalent at the time.

In 1901, Broden[24] examined several cases of sleeping sickness at Leopoldville (Congo), and found in the blood and in the cerebro-spinal fluid (*post mortem*) a bacillus which grew abundantly on potatoes. This bacillus was not agglutinated by the blood of patients suffering from sleeping sickness. The same year the Portuguese Government sent a Commission to Angola to investigate the etiology of sleeping sickness. Bettencourt and his colleagues[10] isolated a *diplo-streptococcus* from the cerebro-spinal fluid which they obtained by means of the lumbar puncture made during life or *post mortem*. Lumbar puncture was performed in nine cases. In six of these it gave positive results, the bacteria being easily isolated, in the other three the examination of the direct preparations and the cultures gave negative results. This streptococcus was also found in the blood and in the lymph glands.

Quite recently a similar streptococcus has been seen by Castellani who, together with Low and Christie, was sent by the Foreign Office and the Royal Society to study the disease in Uganda. Castellani[25] found the streptococcus in the blood and cerebro-spinal fluid of patients suffering from sleeping sickness, but he found it very rarely during life, and then only in the last stages of the disease. Indeed, he grew it once only from the blood, although he examined bacteriologically the blood of thirty-seven patients, and in each case repeated the investigation several times, and with different methods. He examined the cerebro-spinal fluid obtained by lumbar puncture in twenty-eight patients, but only five cases gave a positive result, and four of these were examined a few hours before death. Out of six bacteriological examinations of urine, he grew the microbe once. Bacteriological examinations of enlarged lymphatic glands removed during life were negative, and the examination of the spleen juice obtained by puncture during life was likewise negative.

It is difficult to say whether Castellani's streptococcus is identical with the microbe described by the Portuguese Commission. The Portuguese physicians first stated that their diplo-streptococcus grew very poorly on the ordinary culture media, and that they had never succeeded in obtaining cultures on gelatine. Recently, however, they have modified this statement and affirmed that, like the streptococcus isolated by Castellani, it grows very well on gelatine.

Castellani believes that the streptococcus he has found in cases of sleeping sickness is simply a variety of *Streptococcus pyogenes* because, as a rule, it differs somewhat from the typical streptococcus. He thinks that its rôle in the etiology of sleeping sickness may be similar to that of the streptococci in scarlet fever and rheumatic polyarthritis.

The bacteria so far described in cases of sleeping sickness have probably nothing to do with the disease, and, indeed, the extensive bedsores which form towards the close of sleeping sickness fully explain the presence of secondary parasites.

The two cases which were brought to London in 1898 were very carefully examined with regard to bacteria. Dr. Bullock[17] attempted to make cultures from the blood and from some enlarged cervical glands which were removed during life, but none of the cultures had grown at the end of three weeks; he therefore came to the conclusion that no ordinary micro-organism were contained in the blood or glands. At *post mortem* the cerebro-spinal fluid was examined for micro-organisms by cultures, &c., and various organisms, including diplococci, *Streptococci pyogenes*, and bacilli were found, but of course no importance could be attached to these observations.

FILARIA PERSTANS.

In 1891, while examining the blood of a case of sleeping sickness under the care of Dr. Stephen Mackenzie in the London Hospital, Manson discovered the larvæ of a new filaria, which, from their not observing the periodicity characteristic of *F. Bancrofti*, he called *F. perstans*. Later he found these same filariæ in films of blood obtained from other cases of sleeping sickness on the Congo, and in 1898 he again found them in the two cases of sleeping sickness which were admitted into Dr. Abercrombie's wards at Charing Cross Hospital. Struck by the constant presence of these filariæ in cases of sleeping sickness, and by the singular correspondence which seemed to exist between the geographical distribution of sleeping sickness and of *Filaria perstans*, and paralleling the long incubation period of sleeping sickness with the fact that *F. perstans* can remain alive within the body of its host years after the infection area has been quitted, Dr. Manson, without committing himself, very reasonably suggested that this peculiar blood-worm might possibly be the cause of sleeping sickness. When it was discovered that *F. perstans* was found not only in cases of sleeping sickness, but also in a large proportion of the inhabitants of the Congo and of other parts of West Africa, Dr. Manson still held to his hypothesis, because it was supported by the pathology of *F. Bancrofti*. In fact, *F. Bancrofti* does not always cause chyluria, yet there can be no doubt that it is, within the Tropics, and in many sub-tropical countries, a frequent cause of chyluria.

The discovery of the presence of *F. perstans* in British Guiana was very much against the theory of a connec-

tion between this nematode and sleeping sickness, but the diseases of the natives of British Guiana are very little known, and Dr. Ozzard[26] wrote that he believed sleeping sickness to be amongst their ailments, and stated that a Buck woman was brought to him for treatment because, as her friends said, she was always asleep.

Low's[27] recent researches in British Guiana, and the observations he made together with Moffat, Cook, and Hodges in Uganda, have almost proved that *F. perstans* cannot be regarded as the cause of sleeping sickness. *F. perstans* is very common in British Guiana and probably extends over a much wider area in South America, but sleeping sickness is unknown. On the other hand, sleeping sickness is now very prevalent in Kavirondo, along the north-east shores of the Victoria Nyanza, but the filaria is quite exceptional.

TRYPANOSOMA CASTELLANII (KRUSE).

On November 12th, 1902, while examining the cerebro-spinal fluid obtained from a case of sleeping sickness by lumbar puncture during life, Castellani discovered a trypanosome. At first he did not give much importance to this finding. He considered the presence of the flagellate a mere coincidence, and thought it had probably arisen from admixture of blood during puncture. Later, however, he observed that trypanosomes were of frequent occurrence in the cerebro-spinal fluid of patients suffering from sleeping sickness, and he was able to demonstrate their presence in twenty out of thirty-four examined, that is to say, in 70 per cent. of cases. He found them also twice in the cerebro-spinal fluid obtained *post mortem* from the lateral ventricles.

Besides the ordinary forms, he found certain roundish bodies which, stained by the Romanowsky-Leishman method, show the chromatin gathered in two or more points. They resemble amœbæ, but do not project pseudopodia. These bodies he also found in the blood, especially during the last stages of the disease, and believes them to represent the "amœboid forms" described by Bradford and Plimmer in *Trypanosoma Brucei*. Once, in the blood, he found the active trypanosome

Castellani's trypanosome closely resembles *T. Brucei*, but Castellani mentions certain slight morphological peculiarities by which, he thinks, it may be distinguished from *T. Brucei* and from *T. Nepveu*.* The points of difference are: a more or less rounded anterior extremity (posterior extremity of most authors†), the centrosome outside the vacuole and much closer to the extremity, the larger vacuole placed before the centrosome, the longer free portion of the flagellum and fewer granules at the posterior extremity.

FIG. 2.—Trypanosoma found in Sleeping Sickness.

Having seen two or three specimens only of Castellani's trypanosome, I am unable to state anything definite as to its specificness. The distinguishing features enumerated by Castellani are far from being constant, as he owns himself, and we know that both *T. Brucei* and *T. Gambiense* vary considerably in size, in shape, in the relative position of centrosome and vacuole, and in the form of the anterior extremity, which may be pointed, rounded, or sharply truncated. Besides, it is still a moot point whether the parasites of Nagana, Surra and Mal de Caderas represent one or more species.

The very different geographical and zoological distribution of nagana and sleeping sickness show that *T. Brucei* and *T. Castellanii* are quite distinct. I do not think, however, that for the present we can distinguish Castellani's trypanosome from the trypanosome previously found in man by Nepveu,[28] Forde,[29] Dutton,[30] Manson,[31] and Baker.[32] But it is quite possible that the two do represent different species, or varieties, or "tribes,"‡ and, indeed, we have several examples, both in mammals and fishes, of different species of the genus *Trypanosoma* simultaneously infesting the same vertebrate host.

As to the relation between *T. Castellanii* and sleeping sickness, Castellani says: "From the whole of my researches, I am inclined to come to the conclusion that sleeping sickness is probably due to the trypanosome I have described." Personally, I think there is much to be said in favour of this connection. Of course, the deposition of *Filaria perstans* will cause many to hesitate before they accept a new pretender, but we should consider that whilst the filariæ are, frequently, almost harmless to their hosts, the trypanosomes are very dangerous parasites.

A comparison between sleeping sickness and the various diseases of animals caused by trypanosomes is decidedly in favour of the trypanosome theory.

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* This trypanosome was first discovered by Nepveu in Algeria, in 1898. Dr. Forde found it again in 1902, and Dr. Dutton proposed to call it *T. Gambiense*; Dr. Manson, in his book on "Tropical Diseases," calls it *T. hominis*. The geographical name given by Dutton is objectionable, because the parasite is not confined to the Gambia, nor was it found for the first time there; besides, there is nothing more unstable than geographical distribution. The name *T. hominis* is likewise objectionable, because several species may attack man. I think that by right of priority Nepveu's name should be associated with the discovery of trypanosoma in man.

† *T. Castellanii* moves with the more rounded extremity foremost, besides, analogy with other non-parasitic flagellates points to this extremity as the anterior—the flagellum in the latter subserving nutrition as well as locomotion. The micronucleus or centrosome probably represents the eye-spot which, in other protozoa, such as the *Euglenæ*, is placed at the base of the flagellum, and in contiguity with the contractile reservoir (vacuole).

‡ I would suggest the name "biologic species" already used by botanists.

THE TSETSE FLY.

The discovery of a trypanosome in sleeping sickness suggests a very definite line of research with regard to the etiology, epidemiology and prophylaxis of this fearful disease.

We know that trypanosoma infection may be contracted either by direct contact (dourine), or through the intermediation of blood-sucking insects (nagana, surra, rat-trypanosomiasis). In dourine, or "Maladie du Coït," the disease is acquired, like syphilis, during sexual congress. Schneider and Buffard produced dourine in a bitch by simply smearing the vulva with blood containing *Trypanosoma equiperdum*. Subsequently two dogs covered this bitch, and both contracted the disease in about a fortnight. Nagana and surra are spread by blood-sucking flies. Major Bruce[33] proved that *Glossina morsitans* is a carrier of nagana in Zululand, and Rogers[34] found that a horse-fly (*Tabanus*) disseminates surra in India. *Trypanosoma Lewisi* is propagated amongst rats by the fleas peculiar to these rodents.

FIG. 8.

The former limitation of sleeping sickness to West Africa, the peculiar patchy distribution of the disease along the large river valleys, its failure to spread in the West Indies, in South America, and in other countries, though frequently imported with negro slaves, and the possibility that, like nagana, it is caused by a trypanosome, suggest a fly of the genus *Glossina* as the carrier.

The genus *Glossina* comprises several species, some of which have a wide distribution in West Africa. The carrier of sleeping sickness should be sought amongst the latter.

A most interesting and important point which, so far, has not been definitely ascertained is the manner in which the tsetse fly conveys nagana.

In South Africa, nagana has long been known to Europeans as "fly disease." In 1895 Major Bruce discovered that the tsetse flies are not venomous, but that, like the cattle-tick (*Ripicephalus annulatus*) in Texas fever, they inoculate, with their bite, a deadly protozoal organism. By infecting susceptible animals in Ubombo with flies gathered in the low country where nagana prevails, Major Bruce was able to prove that the *Glossina morsitans* is a carrier of the distemper. Taking into consideration that an animal suffering from nagana does not communicate the disease to other animals in places devoid of tsetse flies, and that both the distribution of the disease and the distribution of the fly show the same striking peculiarities, it may be reasonably surmised that other blood-sucking ectoparasites are, as a rule, unable to convey the nagana flagellate. So far, very few experiments have been made to settle this point, and the various species of the genus *Glossina* have not been tested.

Major Bruce states that *Glossina morsitans* carries the nagana parasites from affected to healthy animals much in the same way as the vaccinating needle carries the infection of vaccinia from child to child. He further remarks that the fly is capable of inoculating living trypanosomes twelve, twenty-four and even forty-eight hours after having sucked the blood of an infected animal. I very much doubt that this can be the usual mode of transmission. If the tsetse fly acted merely in the way suggested by Major Bruce, it would be difficult to understand why the disease is not spread by other blood-sucking animals, such as mosquitoes, fleas and ticks, all of which are known to be capable of transmitting blood parasites.

I am inclined to believe that *Glossina morsitans* is a definitive host of *Trypanosoma Brucei* just like *Anopheles costalis* is a definitive host of *Hæmamœba Laverani*. Two important facts suggest this theory. First, the limitation of nagana to the so-called "fly belts"; secondly, the probability of a double alternating cycle in the life-history of the trypanosome.

The probability of a dual life-cycle in trypanosomes is not only suggested by the analogy of other parasitic

protozoa, but by a very general law which limits the continuancy of growth by asexual reproduction, and, indeed, under unfavourable conditions the trypanosomes are known to assume peculiar forms which may be the representatives of a sexual or resting stage.

In studying the natural history of the tsetse flies, I was struck by certain facts which I think may help us in elucidating the etiology and epidemiology of trypanosomiasis.

Major Bruce noticed that "the tsetse fly does not lay eggs as do the majority of the Diptera, but extrudes a yellow-coloured larva nearly as large as the abdomen of the mother. This larva is furnished with a black hood at one pole and two minute spikes at the other. It is annulated and consists of ten segments. Immediately on being born this larva creeps about with a good deal of activity, evidently searching for some cover or hole in which to hide. Having found a resting place, it immediately begins to change colour, and after a few hours has turned into a jet-black hard pupa or nympha." This description clearly shows that the method of reproduction in the tsetse flies is like that of the *Hippoboscidæ*, the eggs hatching, and the larvæ developing and moulting within the body of the parent, so that when extruded they have practically reached the pupa stage. In fact, the extruded larva becomes almost immediately a pupa, the larva skin becoming a hard *puparium*.

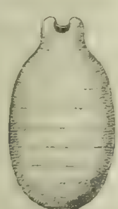

FIG. 4.

The nourishment of the growing larva requires a large amount of blood, and the avidity with which it is imbibed by the gravid female is really astonishing. This peculiar mode of development suggests, I think, the possibility that the transmission of nagana may take place not directly by the fly that imbibes the blood of an infected animal, but by its progeny. Several facts are in favour of this hypothesis. Like mosquitoes, the tsetse flies usually suck blood only once every two or three days. In the transmission of cattle hæmoglobinuric fever (Texas fever) by *Ripicephalus annulatus*, and in that of the malignant jaundice of dogs by *Hæmaphysalis Leachi*, we have examples of the transmission of protozoal parasites by the young of ticks fed on infected animals—the parasites in these two cases probably reach the young when the latter are in the egg-stage, with the food reserve which is derived from the infected blood imbibed by the parent tick.

It has been stated by a number of travellers and sportsmen, and it is also the opinion of the natives, that the tsetse fly follows the big game, and that the prevalence of nagana in a district is proportionate to the number of wild animals. Indeed, it has been asserted that both the fly and the disease disappear as the game is killed off or driven away, and some have gone so far as to urge the destruction of big game, and more especially of the buffalo, in order to protect imported domestic animals. Major Bruce has clearly proved that *Trypanosoma Brucei* affects in a comparatively harmless way the indigenous wild animals. Of thirty-five wild animals examined, ten contained the parasite. These comprised one buffalo, three wildebeests, three koodoos, one bush-buck, and one hyena. It is also quite likely that the fly follows the herds within certain areas, and that, like the Hippbosca of the horse, it may settle for a time on its host. Major Bruce one day killed a wildebeeste and found a large number of tsetse flies on the dead animal. And again on a dead buffalo he counted as many as forty flies. However, we should not misunderstand the bearing of these facts, because the distribution of the tsetse fly is in no way connected with that of big game. The tsetse fly is not found in open plains, although such plains may be literally swarming with game, and on the other hand, places devoid of game may be very dangerous "fly zones." The association between buffalo and tsetse is more apparent than real, both inhabiting densely-wooded, damp, secluded districts; and, indeed, tsetse flies occur in districts where there are no buffalo, and in these places, in which both formerly co-existed, the almost total destruction of buffalo by rinderpest has made no appreciable difference in the number of flies. The distribution of the tsetse fly shows marked peculiarities which exclude altogether the big game theory. The most important features are the invariable limitation to the borders of marshes or river-banks, and the formation of small, scattered stations, only a few hundred yards in extent, called "fly belts" or "fly zones." Sometimes the tsetse is confined to one side of a river in thousands, whilst on the opposite bank not one can be found. The constant association of the tsetse with streams, rivers, or other bodies of water, is, undoubtedly, a very important feature in the natural history of this fly, and one which needs investigation. The only explanation so far advanced to account for it is that the fly waits near water to feed on the animals that come down to drink! In Freetown, Mr. Austen[35] noticed that *Glossina palpalis* always occurred along the beds of streams, and frequently settled on stones projecting from the water. On one occasion he saw quite a number of these tsetse flies congregated on a fisherman's canoe.

The association between mosquitoes and water is very obviously explained by the fact that these Diptera have aquatic larvæ. In the pupiparous genus *Glossina*, the association with water can only be related to food-habits, and I venture to suggest that it might be related to the habit of feeding on fishes. This suggestion will probably appear extraordinary to some, but I will endeavour to show that it is reasonable. In the first place, we know that certain blood-sucking flies can and do feed on fishes. Mr. C. H. Murray[36] saw mosquitoes alight and immediately transfix the fry of trout by inserting their proboscis into the head of the young fish as they came to the surface of the water. "I was so interested in this before unheard of destruction of fish," says Mr. Murray, "that I watched the depredations of these mosquitoes for more than half an hour,

and in that time over twenty trout were sucked dry and their lifeless bodies sent floating away with the current. From this observation, I am satisfied that great numbers of trout, and perhaps infant fish of other varieties in clear waters, must come to their death in this way." Mr. Theobald has observed a small blood-sucking fly, *Simulium reptans*, settled on the bodies of roach while these were lying on water-plants in shoals during the spawning season.

Turning now to the fish of the African rivers and lakes, we find that the suggestion of an association between tsetse flies and fish is supported by the peculiar habits of various fish belonging to the great family of *Siluridæ*, which, according to Mr. Boulenger,[37] is represented in Africa by twenty-nine genera comprising no less than a hundred species. The Siluroids are characterised by having a naked skin and two or more long feelers or barbels on each side of the mouth. The genera *Synodontis* and *Clarias* are of special interest to us; they are found very abundantly all over tropical Africa. The siluroids of the genus *Synodontis* have the curious habit of swimming on their backs with the belly above the surface of the water as if they were dead. In one species (*S. membranaceus*) this habit appears to have brought about a reversion of the coloration, which is dark on the abdomen and light on the back. The fish belonging to this genus can lead an amphibious life, and it is stated that occasionally they feed on grain. Even more interesting are the siluroids of the genus *Clarias*. During the dry season, when there is no longer any water in the meres they inhabit, the *Clarias* live in burrows, like rabbits, coming out towards evening in quest of food. The flesh of the *Clarias* is much esteemed by the natives, and the women go and dig them out of their burrows.

Fish is an important article of food throughout tropical Africa, not only amongst the riverside populations, but also amongst the inland tribes which barter it with manioc, bananas, or charcoal. The fish is usually parboiled in palm oil, and eaten with baked manioc leaves. Much of it is smoked, then kept in baskets and eaten raw.

Having thus hinted to a possible connection between fish and tsetse flies, I will draw attention to the fact that trypanosomes are very common parasites amongst fish. They have been found chiefly in freshwater fish, but quite recently Laveran and Mesnil[38] found them in soles (*Solea vulgaris*) and rays (*Raja punctata* and *R. mosaica*) from the British Channel. Lingard, who examined the freshwater fish of India, states that trypanosomes are especially common amongst those species which live in the mud. It is also important to remark with Laveran and Mesnil that the trypanosomes of fish are strikingly like those of mammals, and very different from those of the closer related Batrachians.

Lastly, to connect the above observations with sleeping sickness, I will point out that the natives of various parts of Africa believe fish to be the cause of the dread disease. Thus, while the Sussus or Sossé (south of the Pongo river) ascribe sleeping sickness to the sting of a fish, the Congo negroes believe it to be due to the consumption of diseased fish with swollen gills.

Another theory somewhat prevalent amongst natives is that infection takes place by means of the saliva of the patient. They always eat with their hands out of the same family dish and lick their fingers after each mouthful. A similar theory is held with regard to nagana, the diseased animals are supposed to contaminate the grass or drinking water by their saliva. This mode of infection is also in accordance with the trypanosoma theory of sleeping sickness, because we know that dourine can be acquired by direct contact with the secretions of the œdematous genital mucosæ. But, in sleeping sickness, direct contact is certainly not the usual means of transmission. On the other hand, dourine is probably also inoculated by blood-sucking insects.

In sleeping sickness the glands most frequently enlarged are those of the neck. In connection with this, it is interesting to remark that it is precisely on the neck and behind the back between the shoulders that the fly most frequently bites man. Of course it may bite any exposed part, and the naked legs of the natives are frequently assailed. Horses and cattle are sometimes bitten on the back, but preferably inside the thighs, beneath the belly or below the tail. The tsetse darts suddenly on its hosts, making a loud buzzing noise. Its flight is rapid and straight. The tsetse will bite at any time, but (according to Bruce) preferably at sunset. It is known to bite by moonlight. In man the bite causes a sharp prick which draws one's attention suddenly to the spot, but the pain is trifling and the subsequent swelling and irritation very slight.

PREVENTION.

I fear that for the present in sleeping sickness Ιατρος ἰᾶται Θανατος. The physician that cures is death. Numerous remedies have been tried, but they were suggested by erroneous theories, and proved invariably useless. The natives have no better treatment; they administer cathartics and diaphoretics, but in early cases they sometimes extirpate or cauterise the swollen glands to prevent the further progress of the disease. This bold surgical interference is common to various populations in West Africa and deserves investigation.

In 1873, in a letter to Dr. J. W. Ogle, Dr. M'Carthy,[39] Assistant Surgeon at Accra, says: "In every case of 'sleeping sickness' there is invariably a chronic thickening of the deep cervical glands of the neck. I mean those glands commonly called the 'glandula concatenata,' and which form a chain from the base of the skull to the clavicle. The treatment adopted by the native 'doctors' consists in removing these thickened glands. I have never seen the operation performed, but it is said to be always followed by cure. In one man I counted no less than thirteen cicatrices in the neck."

Surgeon-Major Gore[40] says: "I had just returned from shooting, when a native was brought to my bungalow with an enlargement of the glands of the neck which he was anxious to have removed. My servant, a Portuguese, informed me that he stated he was afraid he was about to get the 'sleeping sickness.' Upon further inquiry I found that this was really the case and that among the people of the neighbourhood

(Portuguese Senegambia) this enlargement of the glands was considered a premonitory sign of African lethargus. My servant, who appeared to be quite *au fait* with the subject, further informed me that the native doctors always excised or destroyed the enlarged lymphatic glands as a measure of prevention, a process accounting for the many scars which marked the necks and other parts of the bodies of their patients."

According to Corre, the natives of Rio Nunez distinguish two forms of sleeping sickness. One form they ascribe to the poison of a plant known to the sorcerers only—it is, of course, incurable — the other they connect with the enlargement of the lymphatic glands, and believe it can be cured by the cauterisation or extirpation of the swollen glands.

Possibly, during the long period of incubation, the virus of sleeping sickness remains shut up in the lymphatic glands, and only becomes destructive when, under certain obscure conditions, it is set afloat in the circulation. This seems to be the case in hydrophobia, the characteristic stage of the disease being always preceded by irritation, pain or numbness about the part bitten, weeks, months, or years before by the rabid dog.

The natives unanimously believe that sleeping sickness is a communicable disease, and in accordance with this opinion they usually isolate the patients, especially in the more advanced stages of the disease. Dangaix tells us that slave-dealers invariably isolated any slave that showed symptoms of the disease. And, even in Uganda, where the disease has only recently appeared, we see the natives attempting a primitive form of isolation. Dr. Hodges tells us that they drive away into the bush such persons as are suspected of having the dread disease, and that " they have hitherto hidden their sick from the sight of Europeans, probably from the unfounded fear that they themselves may be likewise driven away or disturbed on account of sickness among their people. Even now (at the time of the expedition), in spite of its prevalence, all signs of sleeping sickness might easily escape a casual observer passing through the country. It is only when the poor creatures are stimulated by the hope of medicine or cure, that the sad crowds emerge from their huts and enclosures, or from their improvised shelters in the jungle."

The trypanosome theory of sleeping sickness suggests: (1) The extermination of tsetse flies by suppressing the conditions favourable to its increase; (2) the prevention of tsetse fly bites either by avoiding the " fly zones " or by using appropriate covering; (3) the screening of patients, or their removal from the fly country, to prevent a wider infection of tsetse flies; (4) the careful avoidance of infection by the saliva and other secretions of the patient.

But whatever may be the cause of sleeping sickness, the concentration of patients in suitable camps, and under proper supervision, would be far more humane and judicious than their dispersal in the bush. The advance of sleeping sickness is a serious menace to the development and prosperity of the great African continent, and no pains should be spared, no money withheld, no stones unturned in order to elucidate as soon as possible the etiology of this formidable disease.

REFERENCES.

[1] Clarke, *Lond. Med. Gaz.*, 1840, September, 970; also in *Edin. Monthly Journ. of Med.*, 1842, April.
[2] Dangaix, *Moniteur des hôpit.*, 1861, No. 100.
[3] Nicolas, *Gaz. hebd. de méd.*, 1861, Octobre. 670.
[4] Santelli, *Arch. de méd. nav.*, 1868, Avril, 311.
[5] Guérin, *De la Maladie du sommeil*, Par., 1869.
[6] *Cf.* Ogle, *Med. Times and Gaz.*, 1873, July 6 (information supplied by McCarthy).
[7] Corre, *Gaz. med. de Paris*, 1876, No. 46, 47; and *Arch. de méd. nav.*, 1877, Avril, 292, Mai, 330.
[8] Abblart, *Arch. de méd. nav.*, 1883, Decembre, 456.
[9] Forbes, *Lancet*, 1894, May, 1185.
[10] *Doença do Somno*, Lisboa, 1901.
[11] Cook, Journal of Tropical Medicine, 1901, July, 229.
[12] Hodges, Journal of Tropical Medicine, 1902, October, 293.
[13] Mackenzie, *Clin. Soc. Trans.*, 1890, xxiv.
[14] Manson, Journal of Tropical Medicine, 1898, December, 121; " Tropical Diseases," London, 1898; *Trans. Path. Soc.*, 1900.
[15] Gore, *Brit. Med. Journ.*, 1875, January 5.
[16] Regis and Gaid, *Presse Médicale*, 1898, October.
[17] Mott, *Brit. Med. Journ.*, 1899, December 16, 1666.
[18] Warrington, *Brit. Med. Journ.*, 1902, September.
[19] Calmette, *Arch. de méd. nav.*, 1888, November, 321.
[20] Ziemann, Journal of Tropical Medicine, 1902, October, 309.
[21] Cagigal and Lepierre, *Coimbra Medica*, 1897, Nos. 30, 31.
[22] Brault and Lapin, *Arch. de Parasitol.*, 1898, i., No. 3, 369.
[23] Marchoux, *Ann. de l'Inst. Past.*, 1899, No. 3, 193.
[24] Broden, *Bull. Acad. royale de Med.*, 1901, Octobre.
[25] Castellani, Journal of Tropical Medicine, 1903, June, 167.
[26] *Cf.* Manson, " Tropical Diseases," London, 1903.
[27] Low, *Brit. Med. Journ.*, 1903, March.
[28] Nepveu, *Mém. de la Soc. de Biologie*, 1898, December, 1172.
[29] Forde, Journal of Tropical Medicine, 1902, September, 261.
[30] Dutton, " Thompson Yates' Laboratory Reports," Liverpool, vol. iv., part 2, p. 155.
[31] Manson, *Brit. Med. Journ.*
[32] Baker, *Brit. Med. Journ.*, 1903, May, 1254.
[33] Bruce, " Further Report on the Tsetse Fly Disease," Ubombo, 1896.
[34] Rogers, " Proceedings of the Royal Society of London," vol. lxviii.
[35] Austen, " Report of the Proceedings of the Expedition for the Study of the Causes of Malaria," London, 1899.
[36] Murray, " Bulletin of the U.S. Fish Commission," vol. v., 1885.
[37] Boulenger, *Les Poissons du Bassin du Congo*, Bruxelles, 1901.
[38] Laveran et Mesnil, *Archiv für Protistenkunde*, 1902.
[39] Ogle, *Med. Times and Gaz.*, 1873, July 6.
[40] Gore, *Brit. Med. Journ.*, 1875, January 5.

THE DENGUE: A STUDY OF ITS PATHOLOGY AND MODE OF PROPAGATION.

By Dr. H. Graham, Beyrouth.

Although the literature of the Dengue is quite voluminous, and a large number of valuable reports have been made of different epidemics, from that of Java, Cairo and Alexandria in 1779, to that of the eastern end of the Mediterranean in 1889, yet nothing definite has been ascertained with regard either to its mode of spreading or its pathology. A considerable number of autopsies have been performed by careful observers, and no definite anatomical lesions have been found. At one time it was considered a purely miasmatic infection, but since the epidemic of 1899 a strong opinion has prevailed among those who have given

the matter careful study that the disease is purely contagious.

Is Dengue Contagious ?

Professor Dr. O. Leichtenstern, of Cologne, Nothnagel's "*Specialle Pathologie und Therapie*," iv., Band 1, sums up a very careful study of the whole literature by saying that it belongs to "*den contagiösmiasmatischen krankeiten.*" In other words, he believes that it is contagious, but that the contagion requires for its propagation a certain miasmatic environment, and without this it cannot be propagated. The rapidity with which it spreads from one house to another after entering a city, and from one member of a household to another, having once entered the family, shows that it is contagious (von Duringe, "*Denguefieber in Constantinople*," *Monatschrift für Praktische Dermatologie*, 1890, 2 S., p. 16; Malié, article "Dengue," *Diction. encyclop. des Sciences Med.*; Sulzer, Mordtmann, Skottowe, and others). On the other hand, the inability of the disease to spread when introduced into other regions than those in which the miasmatic conditions are favourable have forced many accurate observers in the East and in America to the conclusion that it was *not* a contagious but a miasmatic disease (S. Ornstein, "*Zur Dengue-Frage*," *Deutsche Med. Wochenschr.*, 1890, 2; Wernich, Eulenberg's "*Realencyklopädie*, 1886, v.); "Chrysochoos in Smyrna," A. Hirsch, and others. There is a great multiplicity of evidence to show that it does not spread to any extent when carried away from certain low-lying regions which are its favourite abode. Epidemics in Cuba, Jamaica, East Indies, Réunion, Martinique, and Madagascar, all seem to show that in spite of the most active communication, the dengue cannot spread to any extent when carried into dry and high places in the interior. Very frequently people come down to the coast from the interior, contract the germs of the disease, and then return home, there to be smitten with the fever without the other inmates of the household catching it. This seeming lack of contagiousness under certain conditions and extreme contagiousness under certain other conditions up to the present time has remained unexplained.

With the view of finding out what the conditions were which rendered this disease contagious at one time and not at another, the epidemic which occurred in the city of Beyrouth in the summer of 1901 was seized upon as an opportunity for careful experiment and study of the whole question. This city has certain marked natural advantages which render a study of the dengue easy and enable a student to carry out certain experiments otherwise well nigh impossible. It is situated on the sea-shore, with the Lebanon range rising very abruptly from its outskirts to a height of from 2,000 to 9,000 feet; so that in an hour's or two hours' time one may observe the disease at the level of the sea or several thousand feet above that level. Early in July of 1901 the epidemic began, at first slowly, but as it increased it seemed to gain force and virulence, spreading through every part of the city and the outlying villages. During this epidemic, which was a very severe one, few houses in the city escaped, and usually not many members of a household were spared when the disease once found an entrance. The epidemic was a typical one, the fever lasting from three to eight days, and during defervescence producing an eruption more or less marked. A considerable proportion of the cases —in my own practice 30 per cent.—were followed by a second attack, usually lighter than the first, after an interval of four to fifteen days. During the interval the patient almost always complained of not being entirely well. In a few cases I found three distinct attacks, each one very severe in character, and each one accompanied by an eruption, with considerable desquamation. A description of the 500 and some odd cases that I have seen during the outbreak would differ in no particular way from the cases described by Manson and others.

Is the Mosquito the Factor ?

I saw something of the epidemic which prevailed on the Syrian coast in 1889, and my experience gained at that time, together with what I had learned from the reports of other observers in different epidemics, inclined me to the belief that in the mosquito was to be found the factor which made the dengue in certain localities very contagious, while not at all in others. Between Beyrouth and the mountains to the south exists a immense sand-bank; to the north irrigated mulberry orchards. The houses in the city are without exception badly infested with mosquitoes. With but few exceptions the villages dotting the slopes of Lebanon contain them in greater or less numbers. In the city of Beyrouth itself none of the forms of *Anopheles* have been found, although careful search has been made for them by others as well as myself. The city, however, is terribly infested with *Culex fatigans* and *Stegomyia fasciata*. I have searched carefully a considerable number of the villages on the slopes of Lebanon facing the city, and have found the *Culex fatigans* in almost all of them, even to a height of 5,000 feet above the sea-level. I have also found *Stegomyia fasciata*, although less frequently.

Experiments with Culex fatigans.

At the beginning of the epidemic I commenced a series of experiments in order to determine, if possible, whether the *Culex fatigans*, which exists in perfect swarms in the city, could carry the dengue from person to person.

(1) The first experiment was done with a mother and her nursing child. The day the mother was taken with the initial chill all the mosquitoes in one room were killed by generating chlorine gas, and each day after she entered another room in which the mosquitoes had been so killed. During the fifteen days' time she was under observation three rooms were used, the room after being freed from mosquitoes being each time protected as well as possible from their re-entrance. The mother, who was extremely anxious to protect her son of 8 months from the disease, submitted to the annoyance and trouble. The child was allowed to nurse from his mother during the whole attack of the fever, which was a severe and typical one, and escaped any observable form of infection.

(2) Experiment No. 2 was carried out in the same way, and exactly the same precautions were taken to

keep out the mosquitoes. There were four small children who slept in the same bed on the floor, their ages ranging from 4 to 11 years. The eldest of the four contracted the fever and the other three played in the same room where he lay sick and slept in the same bed with him at night, no one of the three contracting the disease. The rooms were kept free from mosquitoes during thirteen days.

(3) In the third experiment the father of three children contracted the disease in the city, and was willing to submit to almost any inconvenience to protect his wife and children. The same precautions were taken as in Nos. 1 and 2. The man had a severe attack lasting five days, accompanied by high fever, eruption and desquamation. The rooms were kept as free as possible from mosquitoes during seventeen days, with the result that no other member of the family was taken ill.

In several other cases I tried the same experiment, but gave it up because of carelessness on the part of the household, which resulted in my finding mosquitoes in the rooms when I made my visit of inspection. They said the dengue was better than the confinement. However, in those cases where care was taken the results were all that could be expected.

Direct Inoculation.

The evidence, however, in these experiments was of a negative kind, and in order to obtain something more positive, several experiments were done in direct inoculation or infection. My excuse for exposing *men* to infection was that everyone in the city not immune to the disease was going to get it anyway, also that the disease was entirely without danger to life in young and healthy men. The character of the experiment was explained in each case, and the young man, for only young men were used, expressed his entire willingness to have the "aboo-rikal," as it is called, for the sake of the money offered. The difficulty was not to find one willing to undergo the experiment, but to select the best ones from the many who offered. Four men were selected, inmates of houses in which no case of dengue had as yet occurred. In each case several mosquitoes were taken from the netting of patients sick with the fever and put inside the netting of the candidate for the disease, he sleeping night after night with the mosquito in the netting. In one case the initial chill came on five days after the mosquitoes were put in, six days afterwards in a second, and four days after in the third. In the fourth case, no attack having occurred at the end of a week, another batch of infected mosquitoes were put in, with a negative result. This young man gave the history of having had a severe attack of dengue accompanied by eruption and desquamation during the epidemic of 1889. Possibly he was immune for that reason. During that epidemic I had a very severe attack, and during this last one I escaped although constantly exposed, and although I took no means to protect myself. In all of these cases the men were under agreement to remain in their houses in order not to contract the disease in any other way. In a city where so infectious a disease was raging I still felt that these three men might have received the contagion in some other way. In order to avoid this objection mosquitoes were taken from inside the netting of a dengue patient and carried up to a village on the mountain slope where as yet no case had occurred. After visiting my patient for the infected mosquitoes I changed my clothing and took a bath before mounting my horse to ascend the mountain. In this village, about 3,000 feet above the sea, there are *almost* no mosquitoes. It is dry and very healthy. I easily found two young men in different parts of the village who consented for a consideration to take their chances of having the dengue. One of them, after sleeping four nights under the netting with the mosquitoes, was taken with a severe typical attack of dengue. The other had his initial chill after having passed five nights in the company of the mosquitoes. These men continued to sleep under the mosquito nettings I had prepared for them until some time after they were well, all the mosquitoes in the netting having been killed to avoid infection of other people. No other cases of dengue occurred in this village during the summer that I could learn of, although I made the most careful inquiry.

A considerable number of cases occurred in the large village of Aley, which is 2,300 feet above the sea-level. Few of the houses in this village are free from the *Culex fatigans*. Bhamdoun is about 4,000 feet high and very dry, with but few mosquitoes. Here, although the village is on the line of railway and several cases were imported from Beyrouth, yet the disease did not spread among those who did not descend to the city. Several cases occurred in Ainsofar, which is higher up (about 5,000 feet), but which is not so dry as Bhamdoun and which is more infected by mosquitoes. The villages like Arayeh, Schweifat, &c., lower down and near Beyrouth, suffered almost as badly as Beyrouth. In the beginning of the epidemic of 1889, I passed one night in Beyrouth and then went up to a cabin in the Taurus range, 4,600 feet above the level of the sea. There were twelve of us sleeping in this cabin, which is among the pine trees, and absolutely free from any species of mosquito. On the sixth night after leaving Beyrouth I was attacked by a severe dengue of five days' duration, during which time my temperature ranged from 103° to 105° F. There was an eruption, and I desquamated like a scarlatina case. The other eleven who continued to inhabit the cabin with me remained entirely free from the disease.

It seems to me both from the mass of evidence collected on the character of dengue epidemics by others, and from the experiments which I have described, that the mosquito is undoubtedly the factor which we have considered as the miasmatic one in the spreading of this disease. It seems to me also equally certain that the *Culex* which we have considered up to this time harmless does carry the infection of the dengue. The experiments first described in this article by which others were prevented from taking the disease, although in daily and hourly contact with it, by keeping all mosquitoes away from the infected person, would also show that failing mosquitoes to carry the poison the disease is not contagious.

Blood Examinations.

Having determined to my own satisfaction that the

mosquito was the means by which the disease was carried from one person to another, the natural conclusion was that the cause of the disease or the virus must be found in the blood. In the hope of finding it there, I examined the blood of over 100 cases of dengue. I must say that I chose for examination only those in which the fever was high, the constitutional symptoms well marked, and the course of the disease typical. The lighter cases, lasting only one or two days, and with a temperature at no time higher than 100° F., were not examined. The methods used in preparing and examining specimens have been the same as for blood containing malaria parasites. The most satisfactory results were obtained by examining the blood fresh. Specimens were prepared according to Ehrlich's method and stained in methylene blue, borax methylene blue, and Ehrlich's blood stain, but the results were disappointing even with the greatest care. Scrupulously clean slides and cover-glasses were carried by me in a Petrie dish to the bedside of every patient I visited, and after the finger-tip was well cleaned with alcohol and ether, the specimen was made and the cover-glass rimmed with vaseline in order to prevent, as long as possible, changes in the corpuscles. Several times the blood was drawn from some of the brightest spots of the eruption, but in these cases the resulting field differed in no way from that of the blood from the finger-tip. The specimens were examined with a Zeiss 2 mm. homogenous immersion lens (aperture 1·40) and either No. 6 or 8 compensation oculars, apochromatic system.

An Organism Present.

After careful examination of a certain number of specimens I was able to detect in the red blood corpuscles an organism with amœboid movement, and in many ways resembling the *Plasmodium malariæ*. The different phases of its existence have, however, been very difficult to follow, since it comes more slowly to maturity, and runs through its cycle in so much longer time, that no matter how much care was taken to keep my specimens, the corpuscles had degenerated before the parasite could be followed along much of its life's phase. The fever lasts in these cases from four to eight or ten days, and in order to see the parasite in different stages, an attempt had to be made to get my specimens prepared in series, as it were, to show the organism at different times from the initial chill to the end of the fever. The material, however, from which to choose specimens was so plentiful that this was not difficult. In each case a record was kept of the day and hour when the initial chill took place, and of the day and hour when the blood was taken. The illustrations are drawings made from specimens prepared in this way and put as nearly in their natural order as possible. After a certain amount of practice and familiarity with the organism I never failed to find it in any case where the exigencies of my practice did not make me leave my work before I had made sufficiently long or patient search.

Fig. 1 is a fairly accurate representation of what I found in a certain number of red corpuscles when the blood was examined within the first twenty-four hours of the attack. The parasite is of a lighter colour than the rest of the corpuscles. It is sometimes seen in the centre and sometimes at the margin, but constantly changing its position in the corpuscle. It is to be found in a proportionately much smaller number of corpuscles than the malaria parasite in an ordinary case of tertian fever, but it may always be found if careful search is made. In fig. 2 the parasite is shown in a later phase

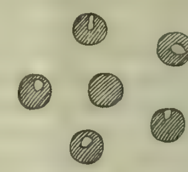

Fig. 1.—A red corpuscle during the first twenty-four hours.

of its cycle, and this is the form in which it is usually seen. It is more easily detected at this time, and it seems to remain in about this state till towards the end of the fever. Another reason why it is more difficult to find than malaria parasites is on account of the absence of pigment such as is formed by the *Plasmodium malariæ* and which catches the eye under the microscope even more readily than the parasite itself.

Fig. 2.—A red corpuscle at the end of thirty-six hours, as seen at different times in the field.

The Organism an Unpigmented Protozoon.

It is evidently a protozoon, but without pigment, and in this it differs from the *Plasmodium malariæ*. It is true that Marchiafava and Celli have discovered and carefully described an unpigmented quotidian parasite, but it differs so in its life-history that it need not for a moment be confounded with this. I know of no blood parasite which resembles it so much as the *Pirosoma bigeminum* (*Boophilus bovis*). It, like the *Pirosoma*, is mostly ovoid in form and very frequently

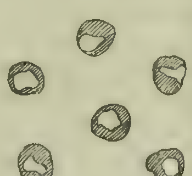

Fig. 3.

Fig. 4.

Fig. 5.—A red blood corpuscle and three white ones, large, and with spores of the hæmatozoon in their interior.

shows a sharply pointed extremity as seen in the parasite of Texas fever. Both are unpigmented forms, but the hæmatozoon of the dengue has not the divided form which has given the name *bigeminum* to the *Pirosoma*.

In figs. 3 and 4 the parasite is seen still further advanced, and about the fourth to the sixth day many portions of broken corpuscles are seen scattered throughout the field. Frequently in specimens of this date the hæmatozoon is found pushing its way out from the remnants of a corpuscle, or it is seen with the mere outline of a corpuscle clinging around it. Very soon after its escape it is seen to undergo degeneration. I have never seen a white corpuscle attack and swallow a parasite while the latter was undergoing amœboid motion, but I have frequently seen degenerated forms or those in which motion, as nearly as I could make out, had ceased, which were engulfed and taken inside active white corpuscles. Frequently towards the end of the attack and for one or two days after the temperature has dropped to normal, leucocytes are found in the field swollen up and markedly enlarged with remnants of the hæmatozoon they have gathered up from the blood plasma.

The blood in cases of second attacks was examined with more than usual care and also in one case of a third attack. In all of them I was able to find this same hæmatozoon. Since the parasites are fewer in number, unaccompanied by pigment, and slower in their development, they are more difficult to find than malaria parasites, but anyone who has had experience in examining for malaria parasites will, I am sure, always find them with care and patience. The constant presence of this hæmatozoon in the red blood corpuscles of those suffering from the dengue, its resemblance to other forms of sporozoa which have been proved to cause fevers such as Texas and malarial fevers, and its propagation from person to person by means of the mosquito, all seem to me to justify the conclusion that in this parasite we have the cause of the dengue fever.

Beyrouth families may be divided into two classes, those who pass the summer in the mountains and those who pass this season in Beyrouth. During the hot months of this summer of 1901 the epidemic raged in the city and left hardly a susceptible person. When it was over and the weather had grown cooler the families who had passed their summer in the mountains came back to the city, believing themselves safe. An epidemic at once broke out among these which did not cease till the commencement of December, and then only apparently because all susceptible individuals had had it. This would seem to show, together with the high percentage of the population attacked (75 to 81 per cent.), that the epidemic ceases not so much because of the approach of cold weather as because of the fact that all individuals not immune have had it. In the month of January, 1902, I had under my care four cases of the dengue, and in February three, in all of which the individuals recently came from the interior where dengue had never been known, and in all of which the diagnosis was made early in the disease by finding the hæmatozoon. None of the seven had been more than a few days in Beyrouth before falling ill with the dengue. These cases show that the dengue may still hang round in some form or other for a considerable length of time after the epidemic ceases. In all the cases cited above and those from which material was taken for experimental purposes, only typical dengue cases were selected. We all know how convenient a term in our climes "aboo-rikal" is. In every case of fever in which it is not possible to make a diagnosis we can satisfy our patients' friends for the time being, if not our own consciences, by responding that it is the dengue, and this at all times of the year, whether an epidemic is prevailing or not. If it happens to be in the winter when no dengue is about we can say "Aboo-rikal el shita," and we have then named the patient's illness to the satisfaction of his friends. A very large proportion of these cases I am convinced have nothing at all to do with the dengue and ought to be included under a variety of other headings.

The experiments above cited have to my mind cleared up the differences of opinion expressed by different medical writers. Von Duringe, Mordtmann, de Brun, Skottowe, and others claiming that it is a highly contagious disease on the one hand, and on the other, Ornstein, Wernich, Chrysochoos, Hirsch and others that it is a miasmatic one and not contagious at high levels. The observations of those who have found it always contagious have been made in regions where either the *Culex fatigans* or *Stegomyia fasciata* abound, and those of the others where these mosquitoes are not found or in but slight numbers. The first experiments done in the summer of 1901 were done with mosquitoes collected at hazard, and although most of the mosquitoes were Culices, yet in almost, if not every case, *Stegomyiæ* were among them.

The Phases of the Parasite in the Mosquito.

In the summer of 1902 I began a series of experiments in an attempt to follow out the parasite through the different phases of its life in the body of the mosquito. These experiments were done almost wholly with the *Culex fatigans*, which I found in every way, by reason of its habits, verocity, &c., a much more facile insect with which to experiment. During this summer I found considerable difficulty in finding typical dengue cases, and must say, in spite of the well-known fact that a person may have several attacks of this disease, that the cases I found which were typical were for the most part those of strangers coming to the city, or those who had not had an attack the previous year. Whenever I found a case of dengue at all typical I introduced inside his mosquito netting from thirty to fifty hungry Culices, and usually got from the netting the following morning one-third or one-fourth of that number with stomachs well filled with blood. These were put in a cage which was liberally provided with water and banana peelings or grapes. The cage was then labelled with date, &c. As many cages were kept as I had cases. Every day a mosquito was killed and with much pains and labour the contents of the stomach, the walls of the same, and the salivary glands were examined under both low and high power. The walls of the stomach and the salivary glands had to be dissected out under the microscope, involving much time and work. The blood of the stomach, which was examined in a normal saline solution, was found to contain the parasite. I observed the changes in its metamorphosis in much the same way and manner as I had found in the blood directly drawn from the patient in the summer

of 1901. It has seemed to me, however, that the development of the parasite in the stomach of the mosquito was more rapid and more distinct than in the blood in the body of the patient. I never failed in any of these cases to find the parasite up to the fifth day after the mosquito sucked the blood, and it has seemed to me that the parasite was detected with more ease and certainty in the blood from the stomach of the mosquito than in that directly from the vessels of the patient. Cases in which the mosquitoes drew the blood early in the attack took more time to develop full-grown spores in the mosquito stomach than those in which the blood was sucked later. However, the changes in the parasite from day to day in the blood drawn from the mosquitoes' stomachs were found to differ in no essential way from those which occurred in the blood of the man sick with the dengue. A much more difficult task was that of the examination of the walls of the stomach. Here I searched carefully from day to day for encysted zygotes, which enlarging should discharge their sporozoites into the general cavity after the manner so beautifully worked out and described by Ross in malaria, but in vain. Neither was I able at any time to discover anything resembling a fusion of a microgamete with a macrogamate in the blood while in the stomach of the mosquito or in the blood of the patient.

Sporulation.

The evolution of the parasite resembles that described by Lignieres of the *Pirosoma bigeminum*, which it also most resembles in form. By the process of sporulation, in a short time the walls of the stomach and also those of the salivary gland are soon filled in here and there with spores which are for the most part oval, although many are spherical. In mosquitoes which had drawn blood from a patient ill on the fourth day, I was able to find these spores in among the cells of the salivary glands in forty-eight hours' time, showing the possibility of a mosquito's power to infect in a very short time after drawing blood from a dengue patient. The number of spores discharged from the capsule in one parasite differed in different cases. It was only a very short time after their escape from their parent capsules before they were to be found in the walls of the stomach and among the cells of the salivary glands. These spores, I have no doubt, are what are introduced with the saliva of the mosquito in sucking blood and which, developing in the human blood-current, cause the dengue. Mrs. Graham undertook one day to procure a mosquito for me from one of the cages, and while holding the killing bottle over the mosquito to be caught, did not notice until too late that she was being bitten by another. The third day after she was taken to bed with severe nausea and vomiting and high fever, the attack running the course of a typical sharp attack of dengue. This was her first attack of dengue, and there had occurred at no time during the summer any cases in the house, neither had she been anywhere else to expose herself to this disease. The mosquitoes in this cage had drawn blood from the dengue patient fifteen days previous to the time when she was bitten. Some of the mosquitoes in my cages I succeeded in keeping alive for a month after they had become infected, and even up to that time the spores of this hæmatozoon were found in the salivary glands.

Inoculation of Dengue.

An attempt was made to inoculate individuals with the salivary glands carefully dissected out and thoroughly mixed in a warm sterilised normal peptonised saline solution. This solution was injected under the skin and was taken from a mosquito with a twenty-seven days old infection. On the third day the patient had a chill and high fever, and an attack resembling in every way that of dengue, but so strong that I desisted from further experiments in that line. That this was not septicæmia was proved by finding numerous dengue parasites in the blood. I have also begun a series of experiments in an attempt to find out whether the ova of the mosquito may contain these spores as in the case of the cow tick's ova, which may carry the spores of the *Piroplasma bigeminum*. Smith and Kilborne proved that these latter, when mature, inoculate cattle with Texas fever. As yet, however, I have not been able to settle this point.

In the *British Medical Journal* of July 12th, 1902, may be found a well-written article on the dengue by Dr. F. O. Stedman, of Hong Kong. He says, among other things, " In several cases in which I have examined the blood during the relapse I have found malaria parasites, and I hear that others have had the same experience ; thus it seems that the attack of dengue either wakes up malaria, which has been lying dormant in the system, or else renders the patient particularly non-resistant to a chance fresh infection." I believe that Dr. Stedman saw not malaria parasites but the hæmatozoa of the dengue. It is true that it is found in much larger numbers during relapses than in the first attack, but a careful examination will reveal its presence also in the original or first attack. The great mass of people who have a relapse from an attack of dengue have never had any malaria fever either before or after their attack of dengue, and the mass of them live in places (I speak of Syria) where no Anopheles are present to infect them with malaria. The parasite, it is true, resembles in the field of the microscope that of the æstivo-autumnal fevers, yet its development in the stomach and body of the mosquito, its phases of life and progress, are too different to be confounded with the unpigmented quotidian parasite of Marchiafava and Celli. While I am not in a position to speak with authority on the kinds of mosquitoes found in Hong Kong, I cannot help but believe that the parasites seen by Dr. Stedman were the same as those described by me in this article, and that long and careful examination will prove them to follow the same life development.

The discovery of the cause of dengue proves that it is also one of the malarial fevers, and therefore the same means now used to prevent malarial fevers must also be used to prevent communities from getting the dengue. It is therefore a question of war against the mosquitoes, and when the *Culex fatigans* has been destroyed from among us I believe the dengue will be with us a thing of the past.

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THE

Journal of Tropical Medicine

July 1, 1903.

PAPERS RELATING TO THE INVESTIGATION OF MALARIA AND OTHER TROPICAL DISEASES, AND THE ESTABLISHMENT OF SCHOOLS OF TROPICAL MEDICINE.

Presented to both Houses of Parliament by Command of His Majesty, June, 1903.

In a series of circular despatches addressed to the Governors of all Colonies, Mr. Chamberlain drew attention to various medical and sanitary subjects, "more especially in connection with the investigation of malaria and the training of medical officers in the treatment and prevention of Tropical diseases." The beneficial results of these circulars have now become a matter of history. Our knowledge of malaria and of many other Tropical scourges have not only been increased thereby, but practical measures for their eradication or treatment have been advanced at a pace unprecedented in the history of medicine.

The direct interest taken by a Cabinet minister in the sphere of practical sanitation is a new and hopeful feature of our times; and the marvellous and rapid results achieved not only justify the steps taken, but the immediate benefits obtained are sufficient in themselves to amply reward that minister for his wise and well-timed intervention. It may be truly said that all mankind have benefited by Mr. Chamberlain's forethought; and the future developments of the work he has initiated are calculated to exceed even the most ardent anticipations.

The exploitation of Tropical diseases and the furtherance of the objects Mr. Chamberlain had in view in his circular have been placed on a secure foundation. He has, with the rare perspicuity of genius, begun at the beginning and gone to the root of the matter by affording the means of obtaining a scientific and practical training to medical men, whose business in life it is to treat and to study Tropical ailments.

The establishment of schools of Tropical medicine in London and Liverpool, the invitations to leading medical schools in the realm to give greater prominence to the study of Tropical medicine, and the intimation to Colonial Surgeons that their periodical medical reports should be re-cast in one uniform style, have given a stimulus and precision to the study and recording of Tropical diseases heretofore unknown. It is needless to recapitulate the steps which have been taken for the investigation of malaria and other Tropical diseases, or to repeat the history of the formation of the schools of Tropical medicine given in Mr. Chamberlain's circulars; their perusal will afford interesting and instructive reading, but the facts they record have been so imprinted on our memories from day to day during the past few years, that were it not for those coming after us, we would be apt to neglect their preservation.

The historian, when he comes to write Mr. Chamberlain's career, will find much in it to

fascinate and arrest his attention. The life of a statesman is devoted to directing political thought, or gathering together public opinions, so that the will of the people may be given effect to in a judicial and practical form. In both these spheres the historian will find ample material at hand in dealing with Mr. Chamberlain's career, and will have much to record.

The greatest political accomplishment of a statesman in his day and generation may, however, be forgotten; his supreme effort may be judged by those coming after him as unsuited to their day and generation. The annexation of a province may be condemned by posterity, laws giving the people cheap food may even come to be held to be unwise, increase of taxation, diminution of taxation may in turn each be condemned, and there is no permanency in Acts of Parliament or in the edicts of any Sovereign. Withal, therefore, as time passes, and the events of yesterday fade into insignificance before those of to-day, when years accumulate and a century is added to the history of a nation and its people, what do they teach us but that the acts and laws brought into being by our great statesmen of the past are apt to be ephemeral and to be set aside as occasion demands. In Mr. Chamberlain's case, who can prophesy what posterity will think of the political enactments he has been concerned with; they may continue for all time, or be adjudged unsuited to posterity. Any or all of these may prove ephemeral; but in the exercise of the power which his genius and his high place in the State have placed in his hands, though all his other works may vanish, there is one which will endure; for he has founded and inaugurated an educational system and centre which must continue so long as suffering humanity appeals to us.

The prophylaxis of disease is not an ephemeral but an eternal theme, and in all parts of the world, be the sufferer the native coolie or his European employer, the name of the great statesman who grasped that the health of the people was the very essence of empire, will live for all time.

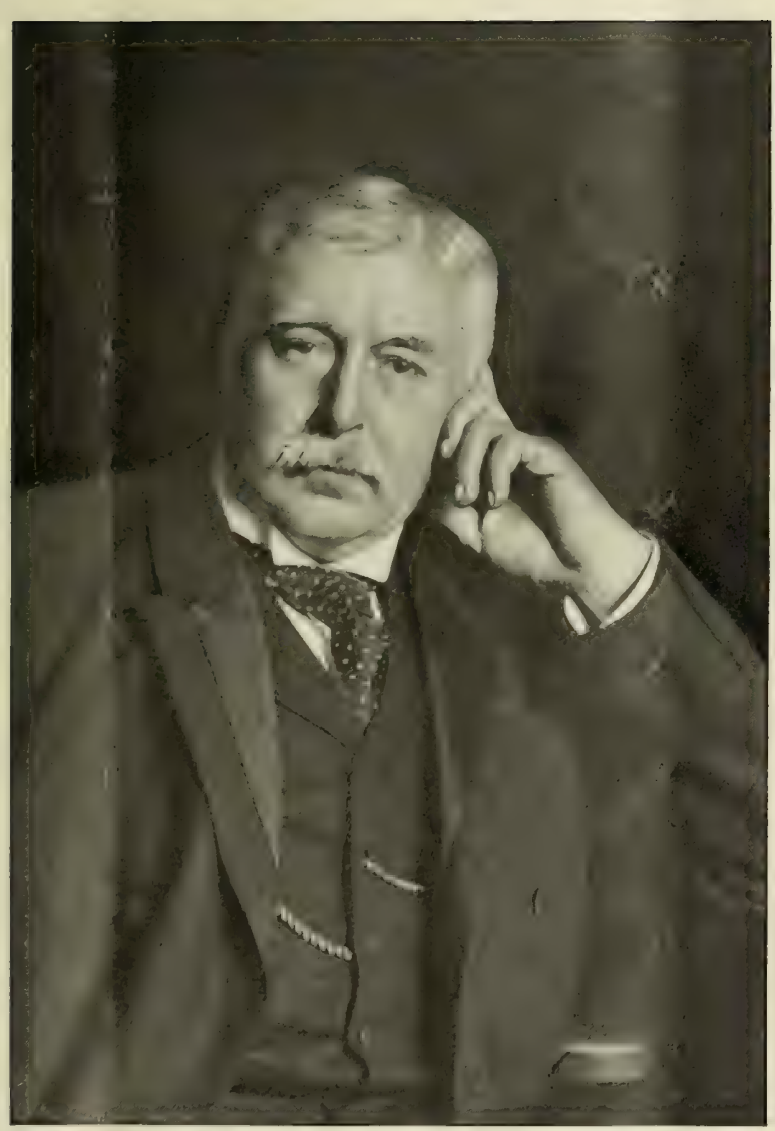
SIR PATRICK MANSON, K.C.M.G., F.R.S.

The appearance of Patrick Manson's name amongst the list of birthday honours will be universally welcomed. It is not necessary to recapitulate the story of Sir Patrick's recent scientific triumphs; it is known through the wide world by every one who has ears to hear and eyes to see. It is interesting, however, to recall a time when Manson's work was not appreciated, nor its significance understood. It was long ago, in the distant treaty port of Amoy in China, that Manson laid the true foundation of his world-wide reputation. Unaided by the light and teaching of modern research, he conducted an enquiry into filarial infection, on lines of scientific accuracy worthy of the conceptions and methods of a Hunter or a Pasteur. His proof of the filaria-mosquito theory is a story a quarter of a century old, but when Manson succeeded in proving that the mosquito was the means by which the filarial embryo was conveyed from man to man, the problem of the conveyance of blood parasites by insects was established. By the solution of the filarial problem Manson's mind was given a scientific bent which regulated his thoughts and opinions throughout his career, and which reached full fruition when he accurately gauged and conceived the malaria mosquito theory.

Modern tropical pathology may be said to date from the announcement by Manson that the mosquito was the medium of transmission of the filarial embryo. The discovery attracted but little attention at the time. The Selection Committee of the Royal Society of that period failed to appreciate the meaning of Manson's researches. Had they done so their fellowship would have been bestowed at once, for a better piece of real work was never brought to their notice. However, all is well that ends well; the Royal Society acknowledged and showed its appreciation of Manson's more recent work, by admitting him as a Fellow, and His Majesty, by the title he has graciously bestowed upon him, has signified the national appreciation of Manson's work.

The assistance rendered by Sir Patrick Manson in the establishment of the London School of Tropical Medicine, in furthering the interests of scientific research in the Tropics, and in improving the conditions of the Colonial Medical Service, are duly recognised by Mr. Chamberlain in his recent circular, "relating to the investigation of malaria and other Tropical disease and the establishment of Schools of Tropical Medicine," in which he states that, "largely through the interest taken in the matter by Dr. Manson" these points were brought more definitely to his notice.

Although the filaria- and malaria-mosquito problems overshadow all the other scientific work done by Manson, they by no means exhaust the category. There is scarcely a branch of tropical pathology that has not been advanced by his own immediate observations, or by others working on the lines he has indicated. The direct and indirect good Manson has done is incalculable, for he has encouraged others and shown them how to work, he has stimulated research in many directions,



SIR PATRICK MANSON, K.C.M.G., F.R.S.

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and to the tropical dweller, Native and European, he has brought the blessing of alleviation from suffering and disease.

TROPICAL HYGIENE.

By W. J. Simpson, M.D., F.R.C.P.

Lecture IV.

Food and General Principles of Diet.

Next to Water, Attention to Food is the most Important Factor in the Tropics.—Defective diet is so frequently a source of ill-health, that when the medical man has large bodies of men to deal with it is important that he should be able to ascertain whether the sickness or mortality is due to any cause connected with the amount or relative proportion of the constituents of the diet. For this purpose it is necessary to be conversant with the general principles of diet. These principles are the same everywhere. The human body requires for its sustenance proteids, carbohydrates, fats, salts, and water. The proteids, or albuminates, as they are generally called, contain C H, O and N and S, and supply the nitrogen necessary for vital action, and are classed as nitrogenous food-stuffs. They are the flesh-forming substances which are required for the development, nutrition and repair of the tissues. The carbohydrates and fats contain C H and O, but no N, and are classed as non-nitrogenous food-stuffs. They become oxidised in the system, and the process gives rise to heat and energy, which are used for the maintenance of the temperature of the body, and its internal and external work, such as that involved in respiration, circulation and locomotion. Fats reckoned as starch produce nearly two and a half times the amount of heat and energy as that of carbohydrates. Without albuminates animal life cannot be sustained, but it is possible to live on albuminates for some time without carbohydrates or fats, because a portion of the albuminates is convertible into heat and energy.

Ordinary Natural Foods, such as the Cereal and Leguminous Grains, Animal Foods, Oils and Fats, Starches and Sugars, and Vegetables and Fruit, supply the Alimentary Principles. — A comparison of the chemical constituents of foods shows that they contain in varying proportions the elements that are required. Animal products supply albuminates and fats, but no carbohydrates, except in the case of milk, which contains sugar. Leguminous grains or pulses, such as peas, lentils, and beans, are as rich in nitrogenous substances as meat and fish, and are also rich in carbohydrates and fats. The cereal food grains, such as wheat, barley, rye and oats, while containing a moderate amount of nitrogenous material, viz., about 12 per cent., contain large percentages of non-nitrogenous substances. Among the cereal grains rice is particularly poor in nitrogenous material. Starches, sugars, and animal and vegetable fats and oils contain carbohydrates in large quantities, but no albuminates. Vegetables and fruits contain acids and salts of special value to the human economy.

The quantity of nitrogen and carbon in 100 parts of a food-stuff varies in different alimentary articles, as is seen from the following table taken from Pavy's "Food and Dietetics."

Table, from Payen, showing the quantity of nitrogen and carbon in 100 parts of various alimentary articles. Under the head of carbon is included not only this element, but likewise its equivalent of the hydrogen[1] *existing in the compound in excess of what is necessary to form water with the oxygen present.*

(Multiplying the figures representing the nitrogen by 6·5 gives the equivalent amount of nitrogenous matter.)

	Nitrogen.	Carbon.
Beef, without bone	3·00	11·00
Roast beef	3·528	11·76
Bullock's heart	2·831	16·16
Calves' liver	3·093	15·68
Foie gras	2·115	65·58
Calves' lights	3·458	14·50
Sheep's kidneys	2·655	12·15
Skate	3·85	12·25
Conger eels	3·95	12·60
Cod fish salted	5·02	16·00
Sardines in oil	6·00	29·00
Herrings, salted	3·11	23·00
,, fresh	1·83	21·00
Whiting	2·41	9·00
Mackerel	3·74	19·26
Sole	1·91	12·25
Salmon	2·09	16·00
Pike	3·25	11·50
Carp	3·49	12·10
Gudgeons	2·77	13.50
Eels	2·00	30·05
Eggs	1·90	13·50
Cow's milk	0·66	8·00
Goat's milk	0·69	8·60
Russian caviare	4·49	27·41
Mussels (fleshy substance)	1·804	9·00
Oysters (fleshy substance)	2·13	7·18
Lobster (raw fleshy substance)	2·93	10·96
,, (soft internal substance)	1·87	7·30
Cheese, Brie	2·93	35·00
,, Gruyere	5·00	38·00
,, Cheshire	4·126	41·04
,, Parmesan	6·997	40·00
,, cream	2·920	71·10
,, Roquefort	4·210	44·44
,, Dutch	4·80	43·54
,, Neufchatel, fresh	1·27	50·71
Beans	4·50	42·00
,, green, dried	4·46	46·00
,, Haricots	3·92	43·00
,, dried split	4·15	48·50
Lentils	3·87	43·00
Peas, dried, ordinary	3·66	44·00
,, split, green, dried	3·91	46·00
Hard wheat from the south	3·00	41·00
Soft wheat	1·81	39·00
Flour, Parisian white	1·64	38·50
Rye flour	1·75	41·00
Barley	1·90	40·00
Indian corn	1·70	44·00
Buck wheat	2·20	42·50
Rice	1·80	41·00
Oatmeal	1·95	44·00
Bread, Parisian white	1·08	29·50
,, household, stale	1·07	28·00
,, ,, new	1·20	30·00
Potatoes	0·33	11·00
Carrots	0·31	5·50

[1] A given quantity of hydrogen is equivalent to three times the amount of carbon in capacity of appropriating oxygen under conversion respectively into water and carbonic acid.

	Nitrogen.	Carbon.
Mushrooms, forced	0·66	4·520
Truffles, black	1·350	9·45
,, white	1·532	9·10
Chestnuts, ordinary	0·64	35·00
,, dried	1·04	48·00
Gooseberries	0·14	7·79
Figs, fresh	0·41	15·50
,, dried	0·92	34·00
Plums, dried	0·73	28·00
Nuts, fresh	1·40	10·65
Almonds, sweet, fresh	2·677	40·00
Coffee, from infusion of 100 grammes (3½ oz.)	1·10	9·00
Tea, from infusion of 20 grammes (308¾ grains)	0·24	2·10
Chocolate, from 100 grammes (3½ oz.)	1·52	58·00
Lard	1·18	71·14
Butter, ordinary fresh	0·64	83·00
Olive oil	Traces	98·00
Beer, strong	0·08	4·50
Alcohol, absolute		52·00
Spirits of wine		27·00
Wine	0·015	4·00

Meat has a ratio of 3 of nitrogen to 11 of carbon; bread 1 per cent. of nitrogen and 30 per cent. carbon.

To make up for the daily waste of the body which escapes in the form of nitrogen in the urea of the urine, and of carbon in the CO_2 expelled from the lungs, it is estimated that an adult at ordinary work requires 300 grains of nitrogen and 4,500 to 5,000 grains of carbon, which is fifteen to seventeen times as much carbon as nitrogen. With this waste going on it is important that the supply of carbon and nitrogen should be in the proportion of 1 to 15, 16, or 17, in order that there shall be no excess or deficiency in either element to compensate for the loss.

It is obvious from the ratios of carbon and nitrogen in the table that no one food meets the requirements. For example, since bread contains 30 per cent. of carbon and only 1 per cent. of nitrogen, to supply 300 grains of nitrogen, 30,000 grains, or more than 4 lbs., of bread would have to be eaten. In this quantity of bread there would be 9,000 grains of carbon, which is just double the amount required. Again, as meat contains 11 per cent. of carbon to 3 per cent. of nitrogen, to obtain the requisite amount of carbon from meat alone, three and a half times too much nitrogen would have to be consumed. For these reasons a mixed diet is necessary which shall provide the food-stuffs in the necessary proportions.

The Ratio of Nitrogenous Food-Stuffs to Non-nitrogenous in a Good Diet.—From practical experience it has been found that in a good diet the ratio of nitrogenous food-stuffs to non-nitrogenous should not be less than 1 in 6, *i.e.*, for every six parts of non-nitrogenous material there should be at least one part of nitrogenous material. The nitrogenous food-stuffs may be, and often are, in higher proportion, but they certainly should not go lower. Another important rule, though of secondary importance when compared with that just mentioned, is that the fats and oils reckoned as starch should bear a similar proportion of 1 in 6 to the total non-nitrogenous material.

There are many circumstances which admit of a higher proportion of nitrogenous to non-nitrogenous material than 1 to 6, but none admit of a lower if good health is to be enjoyed. Infants, children and youths require for the purposes of growth more nitrogenous food-stuffs than fully-matured adults. Milk, which is a complete food in itself and which is the diet of infants, contains these alimentary principles in the proportion of 1 to 3·5. More nitrogenous material is also needed during extra hard work, as it gives tone to muscles, keeping them in good condition, and assists in the digestion of large quantities of non-nitrogenous material, which is apt to be somewhat indigestible without admixture with nitrogenous substances. The nutritive value of actual diet in use among persons engaged in various pursuits has been estimated at different times, and from the result standard diet tables have been constructed. Different standards have been obtained by different investigators, and all must be considered as only approximate, because much depends on the kind of food, the digestibility, the class of people on which the observations were made, and other factors. Thus the standard diet for an ordinary labourer has been variously estimated by Moleschott, Playfair and Church :—

	Nitrogenous.	Carbohydrates.	Fats.	Salts.
Moleschott	4·6	14·3	3·0	1·1
Playfair	5·1	22·2	2·2	0·9
Church	3·0	12·4	1·4	—

In Indian jails the standard diet is given by H. King as follows :—

	Nitrogen.	Carbohydrates.	Fats.
Madras	3·64	18·34	2·05
Bengal	2·55	18·70	1·08
Bombay	3·36	17·78	1·50
Punjaub	3·93	19·37	1·59

For various conditions the average may be taken as follows in an adult weighing 150 lbs. :—

	Subsistence. Oz. Av.	Ordinary Work. Oz. Av.	Laborious Work. Oz. Av.
Albuminates	2·0	4·5	6·5
Fats	0·5	3·5	4·0
Carbohydrates	12·0	14·0	17·0
Salts	0·5	1·0	1·3
Total water-free food	15·0	23·0	28·8

These quantities relate to dry food, but as ordinary food contains 50 to 60 per cent. of water, the figures will be more than doubled if the calculation is made on food not water free. A man requires about *one pound* of water-free food-stuff daily in a state of repose, the amount of albuminates, fats and carbohydrates being 2½, 1 and 12 ozs. respectively; for ordinary work *two* ozs. of each of these constituents must be added, making 4½, 3, and 14 ozs. respectively; while for hard work *two* more ozs. should be added, making 6½, 5, and 16 ozs. respectively. Fifty to eighty ounces of water are also drank, the quantity varying with the amount of exertion, as well as the temperature and humidity of the air.

The quantity of food required during idleness is about 0·15 oz. for each 1 lb. weight of the body, or about $\frac{1}{105}$ of the body weight. It, however, varies with the age, much more food being required in proportion to body weight during the period of growth than afterwards. In infancy it is 0·6 oz. for every 1 lb. of body weight, or about $\frac{1}{26}$ of total weight. At ten years of age it is about 0·3 per lb. of body weight, or $\frac{1}{50}$ of total

weight. After puberty it is about 0·2 oz. per lb., or $\frac{1}{50}$ of total weight.

Increased Work requires Increased Food.—It has been estimated that one-fifth of the energy of food is utilised for mechanical work, and that the mechanical value of an ounce of each of the food constituents is, for albuminates, 140 foot tons; fats, 350 foot tons; carbohydrates, 140 tons. So that from these data the amount of extra food required for extra work can be calculated.

To calculate whether a diet is sufficient in quantity and whether it contains the proper relative proportions of nitrogenous and non-nitrogenous elements, there are tables giving the percentages of alimentary principles, and it is only necessary to multiply the amount stated in ounces of each article in the rations by the figures opposite each article of food in the table giving the percentages of alimentary principles and dividing by 100. Thus, if it is a question whether 2 lbs. of bread and ½ lb. of cheese are a sufficient diet for an adult in ordinary work, the calculation may be made as follows:—

Ozs.		Nit. Ozs.	Fat. Ozs.	C'dte. Ozs.		Ozs.		Nit. Ozs.	Fat. Ozs.	C'dte. Ozs.
100	Bread contain ..	8	1½	50,	therefore	32	=	2·5	0·5	16
100	Cheese ,, ..	33	24	0,	,,	8	=	2·6	1·9	—
								5·1	2·4	16
	Whereas the theoretical amounts required for ordinary work are							4·5	3·5	14

The conclusion is that this diet is sufficient both in nitrogenous matter and carbohydrates and slightly deficient in fats. Dr. Parkes estimates the quantity of nitrogen and carbon in the alimentary principles of a diet as follows:—

	Nitrogen. Grs.	Carbon. Grs.
1 oz. of water-free Albuminates contains ..	69	233
,, ,, ,, Fat contains	—	345·6
,, ,, ,, Carbohydrates (except Lactine) contains ..	—	194·2
,, ,, ,, Lactine contains ..	—	175

Applying these figures to the last calculation:—

	Nitrogen. Grs.	Carbon. Grs.
5 ozs. of Albuminates contain	345	1,165
2·4 ozs. of Fats contain	—	829
16 ozs. of Carbohydrates contain		3,117
Total	345	5,111

Which is more than the theoretical amount required.

(To be continued.)

Notes and News.

Nageli Akerblom, in the *Therapeutisch Monatshefte*, April, 1903, in an article termed alte Bekannte (old acquaintances), reminds us that, as far back as 1853, yeast was used in the treatment of furuncles. He also mentions the interesting fact that the native doctors of Central Africa use the strong jaws of large ants to bring the edges of gaping wounds in apposition, in the same way as we use fine sutures.

The State of Massachusetts is vigorously pursuing the war against mosquitoes. The pools, catch-basins and other breeding grounds of the pest are to be "petrolised"; and Worcester, Fairhaven, &c., are spending large sums of money for the same purpose.

The Enno Sander Prize of the United States Association of Military Surgeons has been awarded to Major F. Smith, D.S.O., R.A.M.C., of the British Army. The subject of the essay was the early diagnosis of typhoid fever.

Plague in 1835.—"The accounts from Cairo represent the plague as raging most alarmingly. A letter, dated May 5th, says that above 2,000 persons daily fall victims to it in the city, and numbers in proportion in almost all the provinces of the Delta and Central Egypt. Above 50,000 persons have, probably, already fallen in Cairo alone, which gives the city a frightful appearance. Both there and in Alexandria many Europeans have died of the plague, but chiefly such as did not keep strict quarantine in their houses.

"The day is no longer sufficient to bury the dead, and, contrary to the custom of the Mussulmans, they are now buried by night also.

"The physicians continue with unexampled selfpenial to attend the sick; though the third, named Dusappe, who has lived in Egypt ever since the French invasion, has been attacked; and in Alexandria several have died, and after them their whole families. Mehemet Ali is still in his country seat at Shabra, which is surrounded with a triple cordon."—*Reprint from "The Globe" of 1835.*

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis.

Treatment of Uncinariasis.—Dr. T. A. Clayton at the meeting of the American Medical Association, May 5th, 1903, described the results of experiments conducted to test the safety of administering the alcoholic solution of thymol in ankylostoma injection in the case of dogs. The alcoholic solution in 4 gram doses in the case of dogs of 16 or 17 lb. weight caused gastrointestinal irritation even when given with oil, so as to render it more bland. In dry powder, even in large doses, the drug caused no serious results. He states that there is probably no danger in giving 2 to 4 gm. followed by one to two tablespoonfuls of brandy to a human adult if followed in a few hours by a purgative, such as castor oil or magnesium sulphate. It was probable that the alcoholic solution obtained in this way would be more effective against the parasites, as seemed proven by their much earlier appearance in the stools after the use of the alcoholic solution.

Beri-beri.

Dr. L. H Fales, in a paper read before the Manila Medical Society (referred to in *Medical Record*, April 4th, 1903), drew attention to some of the diseases observed in the prisoners of Bilibid Prison. This prison, which is both a gaol and a penitentiary, lies on the outskirts of Manila. There were 7,090 cases of sickness, and 325 deaths during 1902. Beri-beri furnished by far the greatest contingent of disease, being no less than 77 per cent. of the whole. Most of the beri-beri cases, however, only presented slight symptoms and made a rapid recovery; this is no doubt owing to the fact that these patients were admitted before they had passed the initial stage. Of the others, 15 per cent. were of the dropsical variety, and only a few of the atrophic form were observed; there was an average of 10 per cent. of the pernicious form which was the cause of 90 per cent. of the deaths. The development of this form was sometimes alarmingly sudden.

Dr. Fales considers that the incidence of beri-beri in December, 1901, was caused by cutting down the rations, substituting Siam rice for native rice, potatoes and onions for native vegetables, and the introduction of frozen meat in lieu of native meat. In spite of reduction of overcrowding, improvement of sanitary conditions, &c., the disease increased by leaps and bounds until October, 1902, when it was resolved to improve the diet. A marked improvement followed; the number of cases in less than two months falling from 100 to fourteen. In January, 1903, only three or four cases remained under treatment. Dr. Fales proves, by the introduction of an interesting chart, that the outbreak was not governed by temperature nor dryness or dampness of the atmosphere, but solely to defective rations.

Beri-beri, a Clinical Study, by John W. Bailey. *North-West Medicine*, Seattle, Washington, Feb., 1903.—This article is a clinical study of beri-beri as observed by the author among the Japanese in a small settlement on Vancouver Island. His observations seem to favour the dietetic origin of the disease, a too exclusive rice diet being conducive to the condition.

Dysentery.

Treatment, by Charles F. Mason. Amer. Med. Assoc. Meeting, May 5th, 1903.—Dr. Mason's plan of treatment, as the result of experience gained in the Southern States, was to give 10 grs. of Epsom salts in half a glassful of water every hour, until a movement was obtained free from blood and mucus. This was combined with irrigation of the lower bowel with warm normal salt solution two or three times a day. So soon as the movements assumed an ordinary diarrhœal character he gave astringents in large doses, such as bismuth subgallate, combined perhaps with a little Dover's powder, every three or four hours. The lower down in the bowel the lesions were seated, the more important became the local treatment by irrigation. In convalescence great care was required in the management of the diet. In the subacute and chronic cases the treatment was somewhat different, but even here salines could be used with advantage in the beginning. The patient should be given an anæsthetic, the sphincter well dilated, and the rectum carefully examined with the speculum to detect ulcers, which should be scraped with a curette or touched with pure carbolic acid or lunar caustic. After this the use of saline injections two or three times a day with proper diet often sufficed to effect a cure. Internally large doses of dermatol were useful in such cases.

The Treatment of Tropical Dysentery with Sulphur. *Philadelphia Medical Journal*, March 14th, 1903.—T. H. Weisenburg gives some interesting notes. In the acute cases the patients were kept as quiet as possible, all medication was withdrawn, and a milk diet enforced; they drank sulphur water exclusively and were given a bath in the sulphur spring every morning. The chronic cases were allowed to take moderate exercise, were fed on milk, eggs, fish, beef and vegetables, took a bath twice daily, and drank sulphur water. The results were excellent. In a month the acute cases were cured, and the chronic cases in from three to six weeks.

Malaria.

Malaria, by H. J. M. School. *Weekblad van het Nederlandsch Tijdschrift voor Geneeskunde*, 1903, No. 23.—The author reports that he made prophylactic tests with quinine, but without favourable results. His experiments with mosquito-protected houses were, however, successful in attaining freedom from malaria.

Emoglobinuria familiare in Malarici [Hæmoglobinuria in a Family affected with Malaria], by M. Luzzatto. *Reforma Medica*, Palermo, 1903, page 1300—In a family living in the malaria-stricken district of the Maremma, Luzzatto observed that hæmoglobinuria occurred in several members. The cause was assigned either to malaria or to quinine, as in some the hæmoglobinuria accompanied malarial attacks whether quinine was given or not, and in two cases the condition followed the exhibition of quinine. Luzzatto is of opinion that in some families there may be a congenital tendency to hæmoglobinuria, which may be developed by malarial infection or by quinine.

Treatment.

Malarial Vertigo.

℞.	Quininæ Sulphatis..	ʒiss.
	Pil. hydrarg.	gr. iv.
	Pulv. capsici	gr ij.
	Strychninæ sulphatis	gr. j.

M. Ft. capsulas No. xxxvi. Sig.: One capsule four or five times a day.—Mays, *Journ. Amer. Med. Assoc.*

An Alkaline Chalybeate Tonic.

℞.	Ammonii carbonatis	gr. iij.
	Ferri tartarati	gr. v.
	Syrupi zingiberis	ʒj.
	Infusi cascarillæ	ad ℥j.

Misce et fiat mistura.

Two tablespoonsful to be taken three times a day after meals.—*Med. Times and Hosp. Gazette*, June 6th, 1903.

The Journal of Tropical Medicine.

CONTENTS.—JULY 15TH, 1903.

Original Communications.

A NOTE ON THE PARASITES OF A CASE OF MALIGNANT MALARIA, WITH DISCUSSION ON THE DEVELOPMENT OF THE CRESCENT.*

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THE following notes are perhaps of sufficient interest to publish, as they describe the type of parasite (with the exception of the number of spores) which I have found in what was probably one of the most malarious districts of the Federated Malay States. The severity of the infection is quite unique in my experience of forty-seven fatal cases of malignant malaria admitted to hospital. The peripheral blood contained fully 40 per cent. of infected corpuscles. Large numbers of sporulating parasites were present, and the number of spores was considerably larger than the malignant parasite is usually described as having. In addition, many forms were seen which seems to throw some additional light on the development of the crescent.

The patient, No. 1008, a Chinaman, was admitted to Klang Hospital on September 23rd, 1901, and died a few hours after admission. I did not see him alive, but two films of his blood were taken and stained immediately on admission and quinine administered. Two and a half hours after death I made fresh specimens and three films from the blood of one of the superficial veins of the arm. The specimens were stained by borax-methylene-blue, the only stain in my possession at the time.

On looking at the slides one was struck by the number of infected corpuscles. In the other forty-six fatal cases which have been examined death took place long before the infection had reached this extent. Where the film was thick hundreds of parasites could be seen in a single field. In many corpuscles a number of young parasites were seen; in one six were counted. Another striking feature was the number of the maturer forms present; even rosettes were common. In many places groups of as many as thirty almost fully-developed parasites were counted, reminding one of what is occasionally seen in cerebral and other capillaries. In the stained films these groups of parasites were frequently associated with groups of leucocytes, as if they had greater adhesiveness than the red corpuscles. The colour of the infected corpuscles was rarely affected, although all the corpuscles appeared paler than normal.

On turning the attention to the parasites in detail the perfect rosette (F A 2) was observed. It was about three-fourths the size of a red corpuscle. In all the cases in which fully-formed parasites have been seen the parasite has occupied almost the whole corpuscle. In the centre of the rosette there was an irregular mass of pigment, around which were the spores. The spores at the edge, to the number of fourteen, were fairly distinct, but there also seemed to be other spores heaped up and not definitely to be made out. In the stained specimen twenty-six to thirty could, as a rule, be counted (F A 1). The number, however, varied from twenty-three to forty.

The next form of this series (fig. A 3) was also about three-quarters the size of a red corpuscle, and around it in many cases the remains of a corpuscle were to be seen. It had its pigment particles grouped in the centre, and these showed very active movement. This active movement was still to be seen unaffected twenty-four hours after the blood had been taken. The tendency to formation of spores was seen in the fresh specimen, and in the fixed films there was an irregularity in the staining.

Tracing this series (fig. A 3 to 7), it was noticed that the parasite was decreasing in size, and the pigment

* Being the substance of a paper read on November 29th, 1902, before the Medical Congress at Kuala Lumpur, Federated Malay States, when the blood from the case was exhibited.

in amount. But in all the pigment particles, while in constant and intensely active movement, tended to keep in a group. At times a particle might leave the group and circle through the parasite, but it quickly returned again and was lost in the tumbling, swarming mass. It was noticed, too, that in the larger forms the pigment was mainly central (fig. A 405), but in smaller parasites it was almost invariably eccentric and usually peripheral. So long as pigment could be recognised in this series it showed very active movement.

Next came the commonest form of parasite (fig. A 8), the small unpigmented form with double outline. It was actively amœboid, but at times came to rest in a circle. Several of these, twenty-four hours after the specimen was taken, were still actively motile. This form of parasite could be seen in various sizes down to a body that could only be recognised by careful focussing. As has been said, corpuscles with two or three of these were frequently seen, and in one corpuscle no less than six were distinctly to be seen.

This seemed to be the asexual life-history of the parasite, but the crescent and what seemed to be its phases of development were also to be seen.

The crescents in this case seemed to be unusually plump, and their ends more rounded than usual. In shape they varied from the typical concavo-convex body to a regular spindle, or even in one case (B 3) an oval body.

The distribution and amount of pigment varied considerably, being mainly central in series B, scattered throughout in C, scanty in D, and gathered into two groups in E. The individual particles of pigment varied in size, some pieces being unusually large. Movement among the particles was entirely absent, except in the cases (fig. F 2 and 3, B 5, 9 and 10) of which I shall speak later. To some the remains of the red corpuscles were attached.

In some corpuscles (fig. B 4 and E 2) a crescent-shaped body was seen with pigment more or less centralised. The pigment was without movement, and the protoplasm of the parasite was more transparent than that of the fever forms, *e.g.*, fig. A 5.

Varying but little from each other were a series of parasites, fig. B 5, 6, 7, 8 and 9, in which the elongated shape gave place to the circular. In each of these the pigment was seen to be scattered, and in each the pigment was motionless, with the exception that in B 5 and 9 a faint vibratory movement was seen in single particles. This movement was quite different from that seen in the fever forms of series A. Tracing the series further, a small parasite (B 10) was seen with only four particles, one of which moved slightly, the others were stationary. Lastly, an exceedingly small parasite was seen with a single piece of pigment which showed no movement.

In the series (D 1 to 5) the spindle-shaped form of the parasite was gradually traced back within the corpuscle. In all the pigment was motionless.

Another group (fig. E 1 to 7) showed parasites in which the pigment tended to form two groups. Figs. E 2 and 3 trace this form within a corpuscle. The pigment varied in amount, character, and grouping, but in all was motionless.

Into a group (fig. F 1 to 4) are gathered forms presenting some unusual features. F 1 was a parasite in which the motionless pigment was in single line; F 2 contained two large motionless and a number of smaller actively swarming pieces of pigment. In F 3 a spindle-shaped body was seen completely within a red corpuscle. In it there was a distinct movement among the pigment. There were also seen several pieces of moving pigment within the apparently normal corpuscular plasma and outside the spindle body. This body was seen two and a half hours after the blood had been taken from the vein. F 4 is a diminutive crescent, with motionless, somewhat scattered pigment.

With the single exception of F 2 there was no crescent-shaped body with actively moving pigment. During a two and a half hours' examination neither an oval nor circular body with moving pigment was seen, and no flagellated bodies were observed. Possibly this was due to the crescents hardly having come to maturity, and as I have said, they were plumper than usual. Possibly it was due to the blood having been drawn from a cadaver.

Most of the series, B 1 to 10 and D 1 to 5, could be easily detected in the slides stained with borax methylene blue, on account of their having the same pale blue as the crescent, a colour distinctly less blue than that of the fever forms, a point originally noted by Celli and Guarueri.[1] In the forms smaller than B 9 it was not possible to distinguish shades of colour with my microscope.

THE RELATIONSHIP OF THE VARIOUS FORMS.

Those described as series A were, it seems to me, similar to what is described as malignant tertian. Thayer pictures the full-grown parasite as smaller, but adds a note to the effect that the drawing is incorrect —a note unfortunately omitted by Manson who copies the figures. They were obviously not quartan in the intense activity of their pigment, and in the early centralisation of the pigment and non-enlargement of the host not benign tertian. While some of the stained signets were much larger than others, there was nothing else seen to suggest a mixed infection. The presence of the crescent stamps the case as malignant, and even supposing the case was one of mixed infection, the series A were certainly the malignant parasites.

The number of spores ascribed to the malignant tertian by Manson, Mannaberg, Grassi, and other observers, is usually from ten to twelve, rarely fifteen to sixteen. In this case these numbers were greatly exceeded. Golgi,[2] however, has recorded cases with as many as forty to fifty spores.

The forms of the parasite of most interest are those figured as B 1 to 11, and B 1 to 9, which appear to me to be the stages of crescent development.

It seems to me that if the nature of B 8, viii., which was obviously not a crescent, could be determined, the point would be settled. The characteristics of this parasite were (1) its scattered pigment, (2) its motionless pigment, (3) its difference in staining from the fever forms, *e.g.*, A 5. These put it at once outside of the recognised fever-producing forms of all the parasites. But it may be asked, How far has the fact that

this blood was taken from a man two and a half hours dead affected these parasites? May they not be ordinary fever forms, somewhat altered by the death of the host?

I admit that certain changes had taken place in the blood, as was seen on comparing the sides taken before and after death. In the *post-mortem* blood the ring shape of many of the young parasites was obliterated, and only a small mass of stained parasite was seen. But this was the only difference noted. On the other hand, in both *ante-* and *post-mortem* specimens the difference of staining arrangement of pigment between the two series A and B was seen. And in addition I have frequently seen parasites of this nature in the fresh *ante-mortem* blood of other cases.

Having come to the conclusion that this is not a recognised fever form, I suggest it as being related to the crescent.

From the many observations made on the crescent it is now generally accepted as having an endocorpuscular origin, but the stages of its development are still somewhat obscure.

Bignami and Bastianelli[3] state that the crescent is derived from the small unpigmented form of the parasite. At first, as a result of sporulation, the fever forms are alone reproduced, but "after a variable number of paroxysms a certain number of corpuscles with central pigment, instead of advancing to sporulation, take the ovoid or spindle form and develop into the falciform body."

Thayer[4] accepts Bignami's idea; in his book the description is practically identical. The Italian observers derive it from bodies "with central pigment"; Thayer from "a full-grown parasite." In both cases the idea evidently is that the crescent is derived from a fever form at a very late stage of the latter's existence.

I have been unable to find a description of the forms B 4 to 11, with details of the staining reaction and behaviour of the pigment.

The more advanced forms, if derived from full-grown parasites, would have to become quiescent, alter in their staining reaction, and their pigment would have to scatter.

When the smaller forms have been seen by Thayer, they seem to have been regarded as young fever forms, and the difference of staining has been overlooked. Thayer[5] finds in the fever with which he has to deal that in many of the young fever forms the pigment is motionless, but so far I have not observed in the fever here any young pigmented parasite of the asexual generation in which the pigment did not exhibit very active movement. In the more mature forms, however, the rate of movement varies.

It is easy to understand, therefore, how in a fresh specimen Thayer might regard the young crescent as a young fever form, but in the present case with large numbers of the two kinds before one, a difference was at once detected in the stained specimen and confirmed in the fresh blood.

WHENCE CRESCENTS ARE DERIVED.

It seems to me that this non-crescent-shaped, pale staining body, with motionless pigment is the connecting link between the crescent and the young amœboid asexual parasite. In other words, that the crescent is derived from a young amœboid parasite, and is at an early stage to be differentiated from the asexual parasite by the scattered pigment, which is relatively, and in the great majority of parasites, absolutely motionless, and by the pale staining protoplasm, the characteristics of the full-grown crescent.

I have described the few forms departing somewhat from the series B 1 to 2, which appears to be the normal course of crescent development. There were some few irregular forms, and some in which the pigment was vibratory or slightly motile. But it should not be, for the crescent ultimately becomes a body in which the pigment is very active. Distinct movement and also slight vibration is occasionally seen in the pigment of a fully-developed crescent, and I do not think it surprising if some of the young crescents present these features. Nevertheless this is present in so few that I do not think it affects my conclusions. With regard to Mannaberg's theory, I have never been able to observe conjugation, although doubly infected corpuscles are commonly enough seen. In this and also in another fatal case, however, I observed several interesting pairs of parasites, which prove that even if Mannaberg be correct, in regard to some of the parasites of doubly infected corpuscles conjugating, there are cases where the parasites grow to maturity in single blessedness. I figure five of these in series G; 2, 3, 4 and 5 were from the second case. I had hoped to be able to observe the parasites of the first case when stained by Romanowsky's method, but unfortunately since obtaining the stain I have been unable to make the old slides take it. I regret, too, that many slides were not taken from this case. At the time a severe outbreak of malaria was sweeping the district, and there was an extra pressure of work. I saw the *ante-mortem* blood at 9.30 p.m. and took the blood from the cadaver at 11.30 p.m. As I had to make a sixty miles' journey all the following day I was unable to be present at the *post-mortem* examination, and only a piece of spleen was kept.

The accompanying figures were drawn while the parasite was under observation, and a short description appended. The stained specimen was seen first, and at once the difference of the staining and of the arrangement of the pigment was noted as distinguishing the asexual from the sexual forms. Even then, while curious to observe the parasites alive, it did not occur to me that, in the presence or absence of pigmentary movement, another distinguishing feature would be found. Once noted it was evident that the young crescent had exactly the same characters as the full-grown one. This and confirmatory observations in a considerable number of other cases encourages me to think the observations are correct.

REFERENCES.

Sydenham Society's Translation of Marchiafava, Bignami an Mannaberg's works on the "Parasites of Malaria."

[1] Sydenham Society's Translation, p. 291.

[2] *Ibid.*, p. 225.

[3] *Ibid.*, p. 61.

[4] Thayer's "Malarial Fevers," p. 71.

[5] *Ibid.*, p. 66.

TROPICAL HYGIENE.

By W. J. Simpson, M.D., F.R.C.P.

Lecture IV.—*Continued.*

Food and General Principles of Diet.

(*Continued from p.* 219.)

Man requires a mixed diet and, with certain reservations, it is a matter of indifference whether the mixed diet is obtained wholly from vegetable products, or partly from animal and partly from vegetable products.—The albuminates of meat are more easily digested than those of vegetable products and repair the tissues more rapidly. But as ptomaines and leucomaines are produced in the process of digestion, the more rapidly the digestive process is carried on the more rapidly are these poisonous alkaloids likely to be produced, and there is the chance of their being produced in excess. If the albuminates are habitually taken in excess, not only is there excessive production of alkaloids, but there is an accumulation of waste products in the blood, oxidation is interfered with, and a strain is placed on the functions of the liver, kidneys, and other excretory organs. This is peculiarly apt to occur in warm climates, where, owing to the diminished work of the lungs, oxidation has already been interfered with and more work has been thrown on the liver and other organs to get rid of waste products which are not always sufficiently elaborated, a condition of things that is aggravated frequently by an enforced sedentary life.

Whether grains or meat or fish shall enter most largely into the diet depends a great deal on climate; on the habits of the people, whether indolent or active, and on other circumstances. In countries which are hot, in which animals are scarce or liable to parasitic disease, where oxen are valuable as beasts of burden, and where fruits and vegetables are abundant, the inhabitants as a rule live mainly on a vegetable diet. In India there are Hindoos who take no animal food beyond that of milk and ghee, which is a form of melted butter. There are others who take fish and eggs, and others who eat certain kinds of meat, but abstain from eating beef or pork. Though cereal grains as a rule form the chief foods of the inhabitants of hot countries, rice being the staple food wherever there is plenty of water and rain, still there are large populations even in hot climates whose food is of an animal nature. In cold countries, where different conditions prevail, the inhabitants are chiefly meat-eaters, and the colder the climate the more oil is added to the food. The Esquimaux are an animal-feeding people, and eat large quantities of fat, which supply fuel to keep up the temperature of the body under conditions of intense cold. Time crystallises these customs into fixed habits, which cannot be readily changed without risk of injury to health. Meat-eaters are likely to suffer if they suddenly change into grain-eaters, and *vice versâ*, grain-eaters suffer if they change to meat-eaters. The large quantities of starchy food which grain-eaters consume and experience no difficulty in digesting would be injurious to a meat-eater, while the less bulky but more nutritious food of the meat-eater would not satisfy the hunger of a grain-eater or fruitarian. There is an absolute necessity of modifying the diet to suit it to the physiological requirements of varying climates. Disregard of this law has had many an illustration as its results. In the first Burmese war, for six and a half months the troops were fed on salt rations almost exclusively, and 48 per cent. of them perished within ten months, principally of scorbutic dysentery, while in the regiment of the Cameronians 700 out of 900 were invalided from the same cause in two months.

An excess of fresh meat also produces intestinal derangement. This was shown in the French campaign in Algeria, when the men ate excessively of captured mutton and rapidly succumbed to intestinal disease. The same was noticed in the American Army during the Civil War. An epidemic of intestinal catarrh or dysentery invariably followed a raid in the enemy's country and the capture of quantities of live stock, which was given to the men in excessive amount. Something very similar to this occurred among some of the regiments in South Africa in the recent war.

The defect likely to be in the diet of a European in the Tropics is that it is too nitrogenous and fatty. The European has been accustomed to animal food, which mainly consists of nitrogenous substances and fats, and there is a tendency to continue these in the same proportions as before. Too much meat is taken, which places a strain on the excretory organs, and causes disorder of the digestive functions. The liver and kidneys become congested; fermentation, catarrhs and dyspepsia are set up, accompanied by fever and a certain amount of full-bloodedness which predisposes to sunstroke. Such unhealthy conditions should be rectified by a reduction in the amount of animal food and a more liberal allowance of vegetable food, which supplies the necessary constituents in a less stimulating form more suited to a climate in which congestion of the abdominal viscera is especially apt to occur.

In the Tropics, where the temperature is nearly as high and sometimes higher than that of the bodily temperature, there is not the same necessity for fatty foods as in colder climates, and the substitution of fruits and farinaceous substances for oleaginous articles will not only be more grateful to the taste but will prevent intestinal disorders which, under the circumstances, are likely to be produced by a diet which is too fatty. It would be a mistake, however, to exclude meat altogether from the diet, and in the case of special hard work outdoors meat may be increased in the diet with advantage.

All carbohydrates are converted into glucose before absorption, and in this form are more readily metabolised than fats or albuminates. Owing to the ease with which they are oxidised the carbon is easily liberated for the purposes of energy, and with less production of internal heat. For this reason they are a most valuable factor for the production of energy in the Tropics, as they impose less labour on the organs of digestion. The cereals indigenous to the Tropics, such as maize, rice and the native lentil, are preferable, as they contain less nitrogen.

When energy is to be liberated rapidly with the

least tax upon the digestive system, sugar, an almost pure, soluble carbohydrate, is an excellent food for the purpose. In the Philippines the cavalry horses imported from America became emaciated and refused to eat, until it was discovered that molasses or sweetened water sprinkled on the coarse grass or hay made it palatable. When thus fed they grew fat and sleek.

Among the troops engaged at Porto Rico and the Philippines, whose appetites had become impaired, there was a craving for candies and sweets, which was relieved by a supply of these articles. Experiments have shown that the fatigue of cyclists on long record-breaking trials has more quickly been relieved by sugar than by other foods.

The common defect in the diet of the Hindoo is a deficient proportion of nitrogenous matter. Rice-eating populations are often ill-nourished and weakly because of the small proportion of nitrogenous matter in the rice. Unless other food-stuffs be added which are rich in albuminates, fats, and mineral ingredients, the rice, though agreeable and digestible, is deficient in nourishment. Similarly, in grain-eating populations the starchy constituents are likely to bulk too largely in the diet, and require to be corrected by the addition of a little animal food rich in oil, or of seeds rich in albuminates and oil, such as the ground nuts or soy beans; or by adding other pulses less rich in oil and supplying the requisite amount of oil separately. Excess of starchy and fatty food causes dyspepsia, acidity and flatulence, delays nitrogenous metamorphosis, and produces excess of fat and corpulence.

Wherever there is a deficiency in vegetables and fruits in the diet scurvy is likely to be prevalent, because the vegetable acids and salts are necessary ingredients of a diet. Scurvy is likely to occur in damp low-lying localities, in which the soil is strongly impregnated with salines, chiefly nitrate of potash, or in arid regions where cultivation is impossible. Scurvy is to be met with in India, Central and South Africa, parts of China, Central Australia, and Japan. In scurvy there is intense general debility and certain chemical changes in the nature of the blood, causing effusion and hæmorrhages into the tissues, with swelling of the joints. The gums become swollen, spongy and ulcerated, the conjunctivæ pearly, and the aspect sallow. The disease is accompanied by dysenteries and foul ulcers. The prevention consists in the supply of fresh fruits and vegetables. All anti-scorbutic diets contain a large amount of vegetables containing a large proportion of potash salts. The potato, yam, cabbage, orange, lime, melon, and grape are especially useful as anti-scorbutics. Dried vegetables are anti-scorbutic, but less so than when fresh or preserved. Lemon or lime juice, one ounce daily, is efficient. Vinegar, half to one ounce daily, is a poor substitute. Alcohol is not an anti-scorbutic.

Rickets, a common disease among infants fed on artificial foods, which are more or less starchy in their nature, does not occur among infants fed exclusively on milk, which contains the necessary amount of lime and phosphate in an assimilable from.

The general cause of unwholesomeness of food is either decomposition or a diseased condition of the food. When grain is decomposed and mouldy, which happens after it has been submerged or has been lying in a damp place, it is unwholesome, producing intestinal irritation, colic, diarrhœa, and other poisonous symptoms. Mouldy or sprouting grain should always be condemned as unfit for human food. It is recognised by the discoloration of the grain, a musty odour, and, if well advanced, by adherence of the grains to one another. The microscope will detect the moulds.

Maize, or Indian corn, when decomposed or damaged, is apt to produce pellagra, which is a general non-febrile disease, accompanied by a skin eruption. The parts of the skin exposed to the sun are the seat of the eruption, which begins as an erythema, not unlike a severe sun-burn. It is very symmetrical on the fore-arms and legs. The primary erythema disappears by desquamation, and leaves behind it patches of roughness, or what is considered chapping. These attacks will come on periodically, leaving behind a greater roughness, with at first hypertrophy and later atrophy of the affected skin. In addition to the skin eruption there is usually diarrhœa, denuded tongue, altered knee-jerk, tenderness near the dorsal vertebræ, and melancholia or dementia. Pellagra is common in Italy and in Egypt, where the poorer people live on damaged maize. The symptoms are believed to be produced by a fungus which has grown in the grain when stored in damp places. Whether they are due to fungus, microbe or toxin, has, however, not yet been properly worked out. There can be no doubt, however, that the disease is produced by feeding on unsound maize.

Rye when attacked with the fungus Claviceps purpura causes the disease called ergotism, the symptoms of which are voracious appetite, formication, and coolness and insensibility of the extremities, followed by gangrene or convulsions. When the grain is attacked by this fungus it enlarges and becomes a dark brown colour.

The Kasaric Dhal or Lathyrus Sativus, which is a vetch used as a grain food, mixed often with other grains, produces in too large quantities dyspepsia, colic and constipation, and when habitually eaten in large quantities, paralysis of the legs. The poisonous qualities reside in the grain itself, and is not due to an unhealthy alteration, as in maize, causing pellagra, or to a fungus, as in rye, causing ergotism.

The occasional use of this pulse, or its use along with other food grains, is seldom injurious, though it may produce colic and dyspepsia, but if freely used and for a long period it causes paraplegia. The onset of the disease is usually sudden, preceded perhaps by indigestion, colicky pain, and diarrhœa. The muscles of the lower limbs become affected and paraplegic; the trunk and upper limbs remaining unaffected. The patient has a peculiar gait, the leg with the toes pointed is thrown out in tremulous extension and adduction, the toe reaching the ground before the heel, or the heel does not reach the ground, the gait becoming a tripping on the toes.

A not uncommon source of illness among native populations in the Tropics is the keeping of food which has been cooked over night, or in the early morning, for meals of the next day. This is done to save fuel. The result is often that the food becomes decomposed, or from long

standing amidst insanitary conditions absorbs or has added to it foul emanations or infectious material. The cooking utensils may also add injurious substances to the food. This may occur by cooking acid substances in copper pots or in utensils which have been lined or soldered with lead instead of tin. Food ought not to be prepared in either leaden or copper vessels.

Meat which is perfectly good decomposes very rapidly in the Tropics, and on account of this is not kept long, but is eaten quite fresh. It is generally cooked and eaten the same day that the animal is killed. Putrid meat is easily detected by its smell, by its pale and, later, greenish colour, and by the offensive odour it gives off if cut up into small portions and put into hot water. Decomposing sausages are detected by adding to the boiling water freshly prepared lime water, when a peculiarly offensive ammoniacal smell is given off.

Decomposed meat produces diarrhœa which may assume a choleraic nature. A not infrequent cause of serous diarrhœa, almost indistinguishable from cholera, is that caused by eating fish or brains which are not fresh and have undergone a certain amount of decomposition. It is, however, when meat has been insufficiently preserved that the most serious results are likely to occur from its ingestion. An instance of this happened on board the ss. "Crofton Hall," in the Hooghly. After the vessel left the port of Calcutta, meat that had been indifferently salted was served out to the crew, with the result that all who eat of the meat, twenty-three out of a crew of twenty-nine, were attacked with vomiting and purging, accompanied with cramps, and with other symptoms of so serious a nature that six out of the twenty-three sailors died, and the remainder suffered from extreme prostration, tremblings, and an eruption of boils and carbuncles. Similar symptoms have been produced with tinned meats, the tins of which, from some cause or another, were not air-tight. The ptomaines or poisonous alkaloids formed by the action of the micro-organisms of decomposition on the animal substance, and which are not destroyed by cooking, account for these illnesses. The preservation of food is not always an easy matter, and when decomposition sets in it is occasionally accompanied by the production of most offensive gases, while at other times the gases are almost unnoticeable. An example of offensive gases came before me in Calcutta. Some fresh salmon had been sent out to Calcutta preserved by a new process. The barrel of salmon was sent to the chemical laboratory, and several leading men interested in the subject were invited to see the result. The professor of chemistry began to prepare the lid for opening, but before he had proceeded far in his operation the lid and the contents of the barrel were projected with force up towards the ceiling, and everyone near was besmattered with a most offensive smelling stuff, which could only be compared with carbon disulphide, and the smell of which stuck to everything that was touched by the stuff for at least a week, notwithstanding the most careful washing.

Tinned fish, like tinned meat, has produced choleraic symptoms, and some fish in the tropical seas are poisonous, causing gastro-intestinal irritation, or severe nervous symptoms, with great depression and collapse. The tunny, which is harmless on the European coasts, causes illness when taken in the West Indies. The Indian mackerel and sardine on the Malabar coast are sometimes poisonous, and often the Bombay oyster causes serious illness. So do prawns; also at times fish from foul tanks. Fish may also produce true cholera symptoms occasionally. I have found in the intestines of fish comma bacilli similar in every respect to the comma bacilli in man suffering from cholera. There is on record an outbreak of cholera at St. Petersburg in 1893, when 194 out of 200 inmates of an orphan institute were attacked with cholera within a week at the commencement of a fast, and the outbreak was attributed to the consumption of fish taken from a cholera-infected water.

Milk also undergoes change when kept, and has in some instances given rise to nausea, vomiting, dryness and constriction of the fauces, burning sensation in the œsophagus, diarrhœa, cramp and collapse. Outbreaks of this kind have occurred in America and India, and similar outbreaks have been traceable also to decomposed cheese, and to ice creams. The researches of Professor Vaughan, of Michigan University, have shown them to be due to a ptomaine in the cheese and milk, which has been named lacto-toxine or tyro-toxicon. The tyro-toxicon has been isolated in the form of needle-shaped crystals, which give a blue colour with potassium ferri-cyanide and ferri-chloride.

Milk becomes sour rapidly in hot climates, and more rapidly if the cow is diseased. Milk exposed to sewer gas absorbs the gas readily and soon decomposes. Upon distillation it yields an offensive and poisonous liquid, causing headache and diarrhœa.

Meat may be fresh and yet unwholesome, through not being derived from a healthy animal. The animal may have suffered from disease, acute, inflammatory, or infectious, or it may have been infested with parasites.

Of the infectious diseases, the most important are pleuro-pneumonia, anthrax, cattle plague, foot and mouth disease, and tuberculosis. There can be no doubt that the partaking of the flesh of these occasionally produces injurious results, but thorough cooking seems to render them harmless. If eaten, the internal organs should be destroyed, and the animal ought to be well bled.

As regards parasites, the trichina and cysticerci are the most common. The *Cysticercus cellulosæ* of the pig produces *Tæni solium*, and that of the ox and cow *Tænia mediocanellata*. Measles in the ox and pig are due to these cysticerci. In flesh that is affected by them they appear as small rounded bodies or bladders. They are also to be seen in the liver and lungs. Neither cooking nor salting destroys them, and the meat should be condemned, for if it eaten the cysticercus develops into a tapeworm. In India and in the Tropics generally the pig is a foul eater. It is the scavenger of the district, and, apart from the parasites with which it may be infested, the flesh produces intestinal disturbances. It is eaten neither by Mahommedan nor Hindu. The *Trichina spiralis* in the pig gives rise in the human being to trichiniasis, which is an acute febrile infection, with excessive pain in the limbs, and œdema. The trichina lie coiled up in small oval or

lemon-shaped cysts in the flesh of the pig. Their presence cannot be detected by the naked eye, but a thin section of the meat placed for a few seconds in acetic acid, and then washed and mounted in either water or glycerine, and examined by a lens of 25 diameters, will show them. Flesh of a trichinous animal should be condemned.

Uncooked vegetables when eaten raw may, owing to their having on their leaves eggs or ova, cause intestinal worms. Over-ripe or decayed fruit should be always condemned.

Food other than Meat or Fish may be adulterated. The adulteration may be the substitution or addition of some cheaper and less nutritious article, which may be harmless or injurious to health. Milk has usually water added to it. If pure water is added, the adulteration is merely a fraud, diminishing the nourishing qualities of the milk; but if impure water is added, there is, besides the fraud, the danger of disease being conveyed. In tropical countries, where bacterial and entozoal life is so abundant, the addition to the milk of water from ponds or tanks, which is a common practice, is fraught with considerable danger to those who buy and drink the milk. In England we are familiar with scarlet fever, enteric fever, and diphtheria being caused by infected milk. In the Tropics there is practically no scarlet fever and very little diphtheria; but milk adulterated with impure water is liable to cause intestinal worms, typhoid fever, dysentery and cholera, and not improbably, in the regions where they are present, filaria and bilharzia.

An interesting outbreak of cholera in two different localities, and due to milk from the same source, came under my observation in Calcutta. On board the ship "Ardenclutha," lying in the port of Calcutta, ten men out of a crew of twenty-four were attacked with cholera, Investigation traced the cause to milk. On visiting the residence of the gowalla, or milkman, from whom the milk had been obtained, it was found to be on the edge of a pond; that a neighbour's son had a few days before been brought home suffering from cholera; that the drainage from the infected house passed into the pond; that the soiled clothes of the boy had been washed in the tank; and that, simultaneously with the outbreak on board ship several miles away, there was an outbreak of cholera among the residents around the tank who used it for their water supply.

In other outbreaks the cholera bacillus has been detected in the milk adulterated with water from tanks containing cholera bacilli, and the water of which was causing cholera.

A rough-and-ready way of detecting whether the milk which is adulterated with water has had impure water added to it, is to place some of the milk into a Nessler glass, add a few drops of H_2SO_4, and then a small quantity of metaphenylene diamine hydrochloride. An orange-yellow colour will be produced, indicating the presence of nitrites.

Milk adulterated with water is at times thickened with flour and plantains, with the object of disguising its poorness. Buffalo milk is much richer in fats than cow's milk.

Butter is usually adulterated with large quantities of water, and it depends on the quality of the water as to whether this likely to prove injurious. Other cheaper fats are also added. A very practical and easy way to sample butter is to melt some in a beaker. If the curds fall to the bottom, and leave a clear fat on the surface, there is evidently not much water added to the butter, otherwise the melted fat would be cloudy. Filter the melted butter through filtering paper and treat the fat that passes through as follows: Take 1 cc. of the melted fat and add to it 1 cc. acetic acid which is nearly in a glacial state; then heat; put a thermometer into the mixture, and observe the temperature at which the mixture begins to get turbid. That temperature will indicate whether the butter is a good butter or not. If it becomes turbid between 35° and 50° the butter may be set down as good; if it is higher than 50° it is adulterated. The extent of the adulteration can only be ascertained by analysis.

Ghee, which is purified melted butter, and much used in the East, is frequently adulterated with vegetable oils.

The Exogenesis of Cancer.—Dr. A. T. Brand, in a lecture delivered before the East York and North Lincoln Branch of the Medical Association on March 20th, 1903, concludes his paper thus:—

"For my own part I am satisfied that the exogenesis of cancer is clinically and logically proved, and that the discovery of a causal micro-organism, fulfilling the law of Koch, is only a matter of time. As logical proof I beg to submit these two syllogisms: (*a*) All diseases infectious to the individual are infectious to others. Cancer is infectious to the individual, therefore cancer is infectious to others. (*b*) All diseases infectious to the individual have an external origin. Cancer is infectious to the individual, therefore cancer has an external origin.

"In my address I have stated my reasons for considering the infective agent to be a microphyte rather than a microzoön, and also for believing that such microphyte belongs to a certain class.

"The great and desirable end to be achieved now, is the acceptance of the fact that cancer is, in truth, an infectious disease, so that prophylaxis at least may be carried out. The first and most important step to take is the adoption of compulsory notification of all cases of malignant disease, and their subsequent thorough investigation. This latter can be undertaken by the medical practitioner, while it may be safely left to the experimental pathologist to capture the elusive contagium vivum."

Einiges zur differential diagnose der Hautlepra The Differential Diagnosis of Cutaneous Leprosy, by M. Hirschberg. *Petersburger mediz. Wochenschr.*, 1903, April.—The author recounts the difficulties of diagnosing leprosy at its initial stage and when the cases are atypical. The specific bacillus can by no means always be demonstrated in leprosy, rendering it difficult to differentiate the disease from tuberculosis and syphilis.

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PLAGUE-INFECTED FOWLS IN THE WESTERN MARKET OF HONG KONG

IT is with much satisfaction we see that the Hong Kong medical authorities are following up the conclusions arrived at by Professor Simpson as a result of his experiments and investigations into the causes of plague in Hong Kong, and that ample confirmation of these views is being obtained. The experiments demonstrated that pigs, calves, buffaloes, sheep, hens, ducks, geese, turkeys and pigeons were, in addition to rats, susceptible to plague, and particularly so when fed with plague material, and it was pointed out that the markets would require to be watched and precautionary measures taken with reference to infected food supplies. At a recent meeting of the Sanitary Board, Dr. Atkinson, the Principal Civil Medical Officer of Hong Kong, as President of the Board, referred to the discovery of plague-infected fowls in the Western Market. It appears that on May 31st one fowl was sent from the Western Market to the Public Mortuary, and on examination by the bacteriologist it was found to have died of plague. On June 1st a duck was sent and was also found to have died of plague. On June 2nd four ducks from the same market and one chicken were reported to have died of plague, and on June 3rd a quail was found to have died of plague. These are important facts in connection with the relationship of the food supply and plague. As pointed out by Dr. Atkinson, it is the custom for many of the Chinese to eat the entrails of fowls uncooked. They take the entrails as a sort of relish with their rice. Although this statement was not permitted to pass unchallenged by one of the Chinese members of the Sanitary Board, yet it is known that the Chinese eat fowls only half cooked, preferring them in this condition to those that are well cooked. Under these circumstances the danger of eating plague-infected poultry, which is no doubt sold cheap to the poorer classes, is evidently a real one. Attention was drawn to this market by the death from plague of one of the stall-keepers ten days previous to the examination of the first fowl. During the subsequent cleansing of the market, 99 rats were caught, of which seven were proved to be infected with plague.

The inoculation theory of the plague has become so fixed in the minds of the profession that it has overshadowed every other. The readiness with which animals contract the disease by inoculation, and man by *post-mortem* wounds, though strong evidence in favour of inoculation being one of the methods by which man becomes infected, by no means excludes other methods, nor does it prove, as has been assumed, that it is even the principal channel of infection No disease can be produced more easily in men by inoculation than small-pox, yet there are few who would attribute the chief entrance of the virus into those attacked in an epidemic to accidental inoculation of the skin and infection through a wound or abrasion. This mode of infection takes its place among the others, but it does not hold a prominent position, and it cer-

THE PARASITES OF MALIGNANT TERTIAN MALARIA.

A. Asexual or Fever Forms. *1.* Unstained. I. Stained by Borax Methylene Blue.

B, C, D, E, F. Sexual or Crescent Forms. *1.* Unstained. I. Stained by Borax Methylene Blue.

G. Doubly infected corpuscles.

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tainly does not, as in plague, nearly displace all others. The experience in Hong Kong of plague-infected poultry being found in the markets is suggestive of a source of infection which with the prevailing ideas is apt to be overlooked. We trust that the Hong Kong markets will not be the only ones inspected for plague-infected animals, but that wherever plague exists in epidemic form the food supply will be particularly examined as a possible source of infection. We would commend the research especially to the Indian authorities, to whom it should be of special interest.

The comparative ease with which the animals and birds experimented on in Hong Kong took the infection by the mouth and alimentary canal raises the question whether plague is not more frequently acquired by swallowing infected food, solid or liquid, than has hitherto been thought to be the case. When it is found that such differently constituted animals as monkeys, pigs, calves, sheep, rats, hens, ducks, geese, and pigeons contract plague by feeding on food which has previously been infected, it is difficult to suppose, though it is possible, that man is not likely to be infected in the same way. The monkey is the nearest approach to man of the animals experimented on, and plague-infected food certainly gives plague to the monkey. The plague is of a septicæmic type, and there is no particular enlargement of the glands of the neck. The warning that precautions should be taken to prevent the bringing into the market, or sale, of infected food is not an unnecessary one, and the general warning that care should be taken in the storage and cooking of food during a plague epidemic is also very important, for the part that the plague-infected rat plays in the spread of disease to man is not unlikely to be due, in many instances at least, to the infection of food-stuffs, solid and liquid, the examination of the intestinal contents, urine, and mucus of the mouth of infected rats showing plague bacilli in a certain proportion.

The information gained at Hong Kong accentuates the fact that plague is not a disease confined to man. The infective material from man is liable, if eaten by rats or other animals, to give them plague, and they in their turn are likely to spread it among the animals and poultry of the farm-yard or house-yard in which they are kept, and again pass it on to man. The rat has relations both with man's house and with the premises on which the animals mentioned are kept. To both it is attracted by food, and, should infective material be in either place, its susceptibility to plague by feeding on infective material, from whatever source derived, is likely to favour its chance of being attacked with plague, and when attacked it generally carries the disease elsewhere.

Another important point in connection with this subject is that, after feeding with plague material, not infrequently a considerable period elapses before the animals show any signs of illness. In the case of pigs it is sometimes over a month, and it appears to be occasionally the same in regard to sheep, calves, turkeys, ducks and geese. Though there is no visible sign of illness, yet, if the animal's temperature is taken, its temperature is high and its system will be observed to be out of order. Where marked symptoms do set in they lead to a fatal result very quickly. The ill-defined symptoms and the chronic nature of this form of the disease renders it difficult of recognition, and no doubt contributes to the endemicity of the disease.

Reprint.

NOTES ON MALARIA.

By J. W. Cornwall, Captain I.M.S. With Remarks by Lieut.-Col. J. Maitland and Col. Browning.

Extracted from a Paper published in the "Transactions of the South Indian Branch of the British Medical Association," vol. x., No. 1, July, 1902.

In the month of September, 1900, Captain Giffard read a paper before this Branch, in the course of which he stated that, as a result of his enquiries, it appeared that malaria had first become prevalent in recent years along the Coromandel Coast about 1895. He pointed out that casuarina plantations and their accompanying pools, and hence, in all probability, Anopheles, were to be found twenty years before that date, so it may be inferred that it takes something more than casuarina pools and Anopheles to render a place malarious, if

his information was correct. The people of Ennur mostly ascribe the introduction of malaria to the building of the bridge over the backwater. This bridge was built about 1890, and it is said that Bengali, or some other up-country coolies, were imported to work on it who had suffered from malaria in their own country. It is possible that the missing factor, the parasite, may have been brought to the place in this way.

Whatever the date and method of introduction may have been, the fact remains that some 90 per cent. of the children in Ennur now have enlarged spleens, and that some 40 per cent. had, in the month of March, parasites in their blood, as calculated by Captain James, I.M.S. It follows, then, that if the right species of mosquitoes are there, all the postulates for the propagation of the disease are satisfied.

The members of the Malaria Commission have dissected about 800 *A. Rossii* in other parts of India without finding a single one infected, although at the same times and places they found other species functioning as carriers. A few weeks ago Captain James and I caught thirty-five *A. Rossii* and twenty-five *A. culicifacies*, all fed females, in native huts in Ennur, and dissected them. None of the *A. Rossii* were infected, but four of the *A. culicifacies* had sporozoites in their salivary glands. These mosquitoes were caught in the same houses and under precisely similar conditions, and it is curious, to say the least of it, that 16 per cent. of the one species, and none of the other, should have been found infected. So the experience here falls into line with that of the members of the Commission elsewhere. A week or two later the other members of the Commission also went to Ennur and dissected 200 or 300 *A. Rossii* and a few *A. culicifacies*: I have forgotten the precise numbers. Anyhow, none of the many *A. Rossii* were infected and some of the few *A. culicifacies* were, making a percentage on the total number of *A. culicifacies* dissected at Ennur of about 9 per cent. The highest percentage of infection found by the various expeditions to West Africa was about 10 per cent.

The members of the Commission have for some time been inclined to believe that *A. Rossii*. for unknown reasons, does not carry the parasite in Nature, seeing that they have never yet found an infected one, and that, of other species found side by side with it, although, be it noted, in very much smaller numbers, from 3 to 9 per cent. have proved to be infected. I must say that I somewhat rejoiced when I heard this, for, of the considerable number of wild *A. Rossii* that I have from time to time caught in different parts of Madras and dissected, I have not found one infected, and was beginning to think that I must have been missing the parasites, but it appears now that it was unlikely that there were any parasites to miss. The importance of this conclusion from the point of view of the practical sanitarian I need hardly emphasise, when it is under- *A. Rossii* is by far the most widely distributed species of Anopheles in India. Within Madras Municipal limits the relative prevalence of *A. Rossii* and other Anopheles must be something like 99—1; and if it can be definitely proved to not function as a carrier, the scope of prophylactic measures can be greatly narrowed, not only in Madras, but wherever it occurs in India. However fascinating and probable this doctrine may seem, there is one fact which must not be lost sight of, and that is that *A. Rossii* functions as a carrier of some, if not all, species of the parasite, when it is experimentally fed on suitable cases; and since no one has yet put forward a reasonable theory to account for this remarkable variation in its behaviour when in captivity and in Nature, I think that you will all agree that it would be premature to suspend all operations directed towards the destruction of this species, and to devote attention solely to the less common species, until this discrepancy can be explained. Nevertheless, there are undoubtedly sufficient grounds for believing that *A. Rossii* is not a frequent carrier in Nature, and it behoves all interested in the matter to set themselves the task of identifying the species which chiefly functions in each malarial focus, while not neglecting to ascertain whether *A. Rossii* or the commonest local species can be definitely excluded.

It is still open to question whether Madras or any part of it can be regarded as particularly malarious. Unsupported assertions have been freely made, but the matter has never been thoroughly investigated. A considerable number of cases does undoubtedly occur, and I have seen many instances of apparently fresh infections in Black Town as well as the well-known chronic cases with huge spleens; but in spite of appeals, both personal and epistolary, I have never had any help worth speaking of from local practitioners either in word or in deed. The futility of circular enquiries has been well demonstrated by the fact that not a single answer was received from any one of the 200 medical practitioners to whom I addressed a series of questions on the subject of malaria when I was Health Officer in February, 1901. The recognised tests of the relative prevalence of malaria, which can be relied on in villages, are extremely difficult to apply in a town like Madras. These are the percentage of enlarged spleens amongst children, and the percentage of young children with parasites in their blood. It was a great discovery which showed that it is native children who are the chief source of danger in malarious localities in Africa, and the Commission have proved that the same thing holds good in India also, and that, after the age of about 10 years, parasites can seldom be found in the peripheral blood, the spleen disappears beneath the ribs, and the subject seems to be well nigh immune from fever as long as he stays in that place. The course to be followed now, if a true estimate of the prevalence of malaria in Black Town is to be obtained, is to select half a dozen separate localities and to go from house to house in each, examine the spleens of all the children and get specimens of their blood. The "spleen rate"* and "malarial index" could thus be ascertained, but it would be a work of time and of considerable trouble. More than a year ago I examined the spleens of over 1,100 people in different parts of Madras, in order to determine whether malaria was

* "Spleen rate," percentage of children with enlarged spleens; "malarial index," percentage of children with parasites in their blood.

prevalent in the outlying villages to a greater extent than in the town. The details are shown in the Administration Report of the Municipality for last year, but, roughly, it was clear that most of the outlying villages, such as Viyasarapadi, Palli Teynampet, Perambar, Chaklipaliam, and some villages near the Adyar, were practically free from fever, and that the few cases with enlarged spleens that were found had all become affected in the mofussil. In Black Town, however, six out of 276 persons had enlargement, but these figures are not entirely confined to children, who alone can be expected to give a proper idea.

* * * * *

The Malaria Commission arrived at the conclusion that malaria is quite uncommon in Calcutta, notwithstanding the presence of myriads of *A. Rossii* and in the face of public opinion. I do not think that investigation would prove that it is actually uncommon in Madras, *i.e.*, Black Town, but it seems improbable that it is the terrible scourge that many persons would have us believe. In all probability diagnosis is not as accurate as it might be, and many cases are classed as malaria which are really something quite different, *e.g.*, leucocythæmia, enteric fever, and ascites, all of which I have seen diagnosed as, and treated for, malaria. As to the nature of the fevers that prevail in and around Madras, cases of which should, from time to time, find their way into the General Hospital, up till the time of Captain James's arrival, I had only seen simple tertian and malignant parasites in the slides I had examined. If quartan were among them, I must have overlooked it. Alexander Crombie is responsible for the statement that after thirty years of medical work in Bengal he had never seen a case of quartan, and that he did not think that it occurred in India. The Commission, however, have found it in many places, and it appears to be the parasite that affects out-of-the-way villages rather than towns. In Ennur in particular quartan is very prevalent, and the peculiar thing about it seems to be, as Major A. Buchanan has pointed out, that a man may actually gain in weight and be little affected in general health, even after months of quartan fever. A young fisherman whom I saw at Ennur had had quartan paroxysms regularly for the past three months, and said that he went out to sea as usual on the off days, and only stayed at home on the evening on which he expected the fever to come on. He said that he felt a little weaker than before, but that was all. His temperature at the time was 104°, and he was wandering about, watching our operations. Captain James took a specimen of his blood and found a few quartan parasites. It is probable that the reasons why these cases are not more frequently seen in hospitals are that they occur mostly in jungly places, and that the persons attacked do not suffer enough in general health to lead them to seek for treatment at a distance. Whether a cachectic condition ultimately follows, as in the case of tertian fever, I do not know.

* * * * *

I may here point out that not one blood examination, but several will often have to be made before the final diagnosis can be assured, and I deprecate the routine administration of quinine until the microscope has decided the question. In few cases does it do harm to withhold quinine until the nature of the case has been made plain; and the ultimate advantage to the patient of being treated rationally instead of empirically cannot be gainsaid. It must be extremely rare, and I have not myself heard of such a case, for a person to be admitted with malaria with urgent cerebral symptoms, which call for hypodermic injections of quinine without a moment's delay after the diagnosis is clear, and can in no way affect the general argument. I must not omit to mention that in the blood of many chronic malarial cases, parasites are never found at any time of the day. I have examined many such myself, and used to attribute my failure to find anything to faulty technique, or to the blood having been drawn at the wrong time, but I have since heard that this experience is universal. Whether parasites are somewhere latent in the body, or what progressive morbid process is maintained as a result of their former presence, does not seem to have yet been discovered. One unfortunate fact is alone clear, and that is that there is no specific treatment for this condition. A point of practical importance is that the apparent severity of the fever bears little or no relation to the number of parasites found, and we are still unable to say what the pyrogenetic agent is. In the early stages of a fresh infection, even after two or three definite paroxysms, it may take a long time to find parasites in a film of blood. As is well known to be the case in malignant types, the sexual forms, *i.e.*, crescents, do not appear for more than a week after the first attack; so also in simple tertian and quartan, gametes are not found during the first week, but merely the sexual forms, and it is not until then that the sucking mosquito can become infected, and the sufferer becomes a danger to his neighbours.

A list of mosquitoes found in and around Madras, mostly described by Theobald in his Monograph of the *Culicidæ* of the world from collections made by Captains Giffard, Donovan, and Cornwall in 1899 and the early part of 1900; this list is probably by no means an exhaustive one :—

Anopheles Rossii; Anopheles indica; Anopheles fuliginosus; Anopheles sinensis (sub-species) *indiensis, annularis, nigerrimus, barbirostris; Anopheles culicifacies* (since found at Ennur by James); *Anopheles Stephensii* (Madras, by James, probably a sub-species of *A. Rossii*); *Stegomyia fasciata; Stegomyia scutellaris; Armigeres obturbans; Culex microannulatus; Culex Vishnui; Culex fatigans; Culex concolor; Tæniorhynchus ager; Panoplites annulifera; Ædeomyia squamipennis* (Chingleput).

Colonel Maitland was of opinion that there was a great deal of malarial fever in Madras. In any case it was universally recognised that during the months of July, August, and September fever was rampant in Black Town, some of the inmates of almost every house being attacked. It was extremely important that the nature of this fever should be determined once and for all.

In regard to the question of malaria and mosquitoes at Ootacamund, there were some years in which the latter were rather troublesome in that place, but the

speaker had never seen a case of malaria contracted there.

Colonel Browning remarked that he inferred from Captain Cornwall's paper that some doubted whether malarial fever ever originated in Madras itself, all cases being imported. This was at variance with his experience, he could recall many cases to the contrary. A European came out from England, landed at Madras, was never out of the town, lived in Teynampet, and within six months of his arrival developed enlarged spleen and most typical attacks of malarial fever; he could multiply such cases, as no doubt could every one practising in Madras.

THE EPIDEMIOLOGY OF PLAGUE: NOTE ON THE FLEAS OF RATS.

By Frank Tidswell, M.B., Ch.M.Syd., D.P H.Camb.

Principal Assistant Medical Officer to the Government of New South Wales.

In opposition to Simond's hypothesis that bubonic plague is disseminated by fleas from infected rats, it has been urged that the fleas of rats will not bite human beings. Simond himself, whilst admitting his inability to pronounce upon the species of the fleas found by him upon rats, nevertheless clearly states that they bit human beings upon whom they were placed. Professor Galli Valerio, of Lausanne, has reported that the species of fleas found by him upon rats are *Typhlopsylla musculi* and *Pulex fasciatus*, and that neither of them will bite man. Simond's observations were made in India and Galli Valerio's in Europe, and it seemed by no means improbable that their conflicting results were due to the fleas found by them being of different species.

It does not follow that the fleas harboured by the rats in two widely different places would be exclusively of the same species. With a view to determine this point a collection of fleas was made from the rats coming under my examination during the recent epidemic of plague at Sydney. Of 100 fleas obtained, ten were identified as *Pulex fasciatus*, eight as *Typhlopsylla musculi*, one as *Pulex serraticeps*, and eighty-one as *Pulex pallidus*. It will be seen that no less than four species were represented, and most abundantly one (*pallidus*) not hitherto mentioned, as far as I am aware, as occurring on ordinary rats. Its stated hosts are *Mus albipes* of Socotra and *Herpestes ichneumon* of Egypt. This species bit us in laboratory trials, as did also *Pulex fasciatus* upon one occasion. *Pulex serraticeps* is well known to attack man. The remaining species, *Typhlopsylla musculi*, did not bite us. The details of the observations form part of a forthcoming official report, but in the meantime it may be noted that they tend to remove an otherwise fatal objection to Simond's views.

Correspondence.

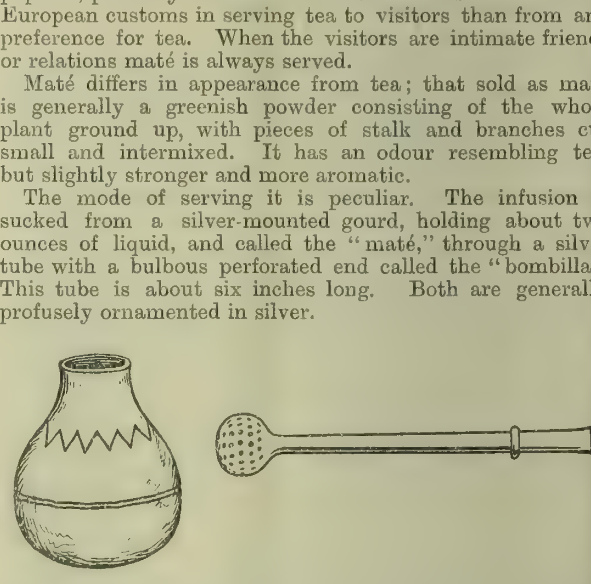
To the Editors of the Journal of Tropical Medicine.

Dear Sirs,—In reply to your request for information regarding maté or Paraguay tea, I send the following particulars.

It is without doubt the Argentine national beverage, but is used more or less by all the people of the other South American republics. Its use amongst the Argentines is universal—high and low, and all ages drink it. Amongst the upper classes, however, tea is now becoming more popular, probably more on account of a desire to imitate European customs in serving tea to visitors than from any preference for tea. When the visitors are intimate friends or relations maté is always served.

Maté differs in appearance from tea; that sold as maté is generally a greenish powder consisting of the whole plant ground up, with pieces of stalk and branches cut small and intermixed. It has an odour resembling tea, but slightly stronger and more aromatic.

The mode of serving it is peculiar. The infusion is sucked from a silver-mounted gourd, holding about two ounces of liquid, and called the "maté," through a silver tube with a bulbous perforated end called the "bombilla." This tube is about six inches long. Both are generally profusely ornamented in silver.



About two teaspoonfuls of the zerba powder are put into the gourd, and boiling water poured in. The tube is inserted, and the maté is immediately ready for sucking. The perforations in the bulbous end of the tube prevent the zerba from being sucked up with the mate. It is generally sucked boiling hot, and some practice is needed before the lips become accustomed to the scalding liquid. Some add a little sugar, but old maté drinkers prefer it unsweetened, or as it is called, "maté amarga." Rum or aguardiente are often added. When the tea has been sucked by one, more boiling water is added and the maté passed on to the next drinker, and so on until all are served. One charge of zerba will serve for two or three persons, then more zerba is added.

It is not considered etiquette for the next drinker to wipe the mouth-piece of the "bombilla," and amongst the lower classes the practice of passing the "bombilla" is undoubtedly a source of labial chancre, and other diseases. The more intelligent instruct the maté server (generally an Indian girl) to pour a little boiling water over the tube before passing it on to the next. Anything between five to twenty matés is the usual ration, and it is the only thing taken in the morning before the 12 o'clock breakfast. It is taken again in the afternoon, corresponding to our afternoon tea, and again after dinner.

The abuse of maté is extremely common, and some women seem to do nothing else all day but suck maté.

In the northern provinces, where coca leaves are chewed, it is no uncommon thing to see both men and women indulge in a combination of maté drinking, coca chewing, and cigarette smoking. A handful of coca leaves are put in one cheek to chew, a cigarette smoked, and maté sucked, all at once and the same time. With some the maté is prepared like tea, and then called "maté cocida." When served in this way with sugar and milk it is very palatable. It has a greenish colour, and a strong odour and taste of tea.

To Europeans accustomed to tea the taste is peculiar at first. and perhaps not agreeable, but the peculiar flavour quickly grows on one. Maté is certainly more stimulating and sustaining than tea. The "peon" or labourer will work hard all day on maté and indulge in only one solid meal a day. They cannot do this on tea or coffee. Personally I only take maté when on a journey or expedition, and the sustaining properties are at once apparent, and I am confident that it is more sustaining than either tea or coffee. Of course it is not a food like cocoa, but on the occasions where tea or coffee were indicated, I should consider maté superior. I know for a fact that many people here live and work for days together subsisting on nothing else but sugar-cane and maté.

As regards bad effects, these resemble very much the symptoms of over indulgence in tea. Indigestion and acidity are very common in confirmed maté drinkers. Palpitation and nervous symptoms are also common, especially in women. On the other hand, there are those who affirm that maté aids their digestion, and that they cannot digest their food without the customary maté taken afterwards. One or two matés will generally remove all desire to eat.

I have been unable to ascertain the proportion of theine as compared with tea and coffee, but I think it must be high.

I hardly think there is any likelihood of it becoming popular in England, unless it could be considered more as a medicine than a beverage. The English residents in Argentina still stick to tea. The great charm is the mode of partaking of it, which lends itself to the vicissitudes and necessities of camp life. No teapots, cups, or saucers are needed; the horseman on a long journey through the forest can make a fire and boil his little kettle of water, and prepare his sustaining maté in the easiest possible way. If he is not alone, so much the better; nothing induces sociability and amicable relations between travellers so much as to give or receive maté.

Yours sincerely,

William C. Paterson, L.R.C.S. and P.Ed.
Medical Officer.

Ingenio "La Esperanza,"
Provincia de Jujuy, Argentina.
May 22nd, 1903.

Reviews.

Etude sur l'hygiene et la medecine au Maroc (Study of Hygiene and Medicine in Morocco). By Dr. L. Raynaud, Director of Sanitation, Physician to the Hospitals of Algiers. 205 pp., 8vo. With Illustrations, Chart and Plates. J. B. Baillière and Sons, Paris. Price 5 francs.

This important book, published under the auspices of the Government of Algeria, is divided into three parts; Hygiene, Medicine and Climatology. Part I. is again subdivided into three parts, which include (1) *General hygiene*, and gives an account of races, slaves, marriages, interments, clothing, food, dwellings, religious orders and their relation to hygiene. (2) *Public hygiene* deals with mosques, baths, prisons, pilgrimages to Mecca and Jerusalem, international sanitary council, &c. (3) *Hygiene*, bearing on the causes of depopulation, famines, epidemics, including plague, cholera and typhoid fever, and the use of intoxicants—alcohol, tobacco, opium, &c.

Part II. includes under "Medicine," such diverse subjects as the actual conditions of medicine in Morocco; medical studies, diplomas; talismans and amulets; the medicinal uses of precious stones; general pathology; syphilitic and cutaneous disorders; surgical treatment and instruments; the drugs of Morocco; eye diseases; obstetrics; veterinary surgery; anæsthetics; Arabian medicine, &c.

Part III. discusses climatology and embraces the general climatology of Morocco, the climate and hygiene of Magador, and Tangiers, Rabat, Marrakesk and Fez.

Dr. Raynaud's book is a result of the observations he made during three visits to Morocco. The state of medical knowledge there at the present time is at the same stage as it was in Europe towards the end of the 15th century, and reveals a remarkable similarity in the notions and treatment of that period and of the Morocco of to-day. The work is ably written and well illustrated; it contains many useful references, and is highly interesting, giving as it does an excellent insight into the manners, customs and life of the people of Morocco at the present day.

A Manual of Plague. By William Ernest Jennings, Major I.M.S. With an Introduction by Surg.-Genl. G. Bainbridge, I.M.S. London: Rebman Limited. 1903. Demy 8vo, pp. 270; 12 plates. 8s.

Major Jennings has written a useful and instructive manual, based upon experiences of plague gained in India. The text is apportioned into ten chapters, of which those devoted to the pathology and the diagnosis of the disease are especially good, the former being effectively illustrated. The concluding chapters on "the measures for the suppression of plague" and "measures for the prevention of the spread of plague" are interesting and instructive. Major Jennings holds that the suppression of plague is to be attempted by (1) Haffkine's anti-plague vaccine or Lustig's plague prophylactic; (2) by isolation of the infected; (3) by segregation of contacts; (4) by the disinfection of houses, clothes, &c.; (5) by evacuation of dwellings; (6) by destruction of rats. The Clayton method of fumigation, whereby SO_2 and SO_3 are generated, is considered the best disinfectant and vermin destroyer. The illustrations and text are excellent.

Notes and News.

The French Government has arranged to provide lady doctors to treat the native women throughout Algeria.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis.

Amongst the miners at Bochum in East Germany the number of cases of ankylostomiasis has increased recently. In 1900 the number of cases notified amounted to 286; in 1901 there were 1,023; and in 1902 a still further increase has been recorded.

Cerebrospinal Meningitis.

"Spotted Fever" (cerebrospinal meningitis), which attacked several men on the receiving ship, "Minneapolis," has broken out aboard the monitor "Puritan," which has been used as an auxiliary receiving ship, owing to the crowded condition of the navy yard at League Island. On Wednesday, May 20th, two landsmen were found to be affected with this disease, the cause of which is supposed to be the crowded condition that has existed on board the ships. All the men on both the "Minneapolis" and the "Puritan" have been ordered to shore camps. This makes a total of sixteen cases of the disease.—*N. Y. Med. Journ.*, May 30th, 1903.

Dysentery.

Etiology of Epidemic Dysentery, by Drs. Vaillard and Dopter. *Le Bulletin Médical*, May 13th, 1903.—From observations made during an epidemic of dysentery among soldiers at Vincennes, France, in 1902, Vaillard and Dopter arrived at the conclusions that the Shiga bacillus is the cause of epidemic dysentery in temperate and tropical countries. Inoculation of animals with the bacillus produced a disease resembling human dysentery. They believe that since the blood of immunised animals affords a degree of prophylaxis, the extension of the principle to human beings may be legitimately regarded as a possible means of cure.

Guinea Worm.

Guinea Worm, by Dr. Leger. *Le Caducée*, July 4th, 1903.—Dr. Leger, colonial surgeon, treated 148 cases of guinea worm in the Soudan during a period of eighteen months. He rejects the theory that the parasite is introduced through the digestive tract, and considers that this takes place direct through the cuticle. Mercurial inunction at the commencement of the disease appears to arrest the development of the worm and to localise the inflammation and suppuration. The injection of a solution of chloral achieved no results. The old-fashioned classical method of extracting the worm has proved most practical, and no method has hitherto been found to supersede it.

Liver.

Tropical Abscess. *Lancet*, July 11, 1903, p. 97.—A Frenchman, aged 36, was admitted into the French Hospital and Dispensary on Feb. 7th, 1903, under the care of Dr. Dardenne and Mr. Owen, complaining of dysentery and pain in the back over the area of the liver. He had just arrived from South Africa, having been exploring in Rhodesia and the region of the Zambesi for the last fifteen years. With regard to his personal history, he had had many attacks of malaria, and six months ago had an attack of dysentery which had not completely cleared up on his admission into the hospital. His condition on admission was as follows: He was very exhausted, with a temperature of 102° F. and a pulse of 132. There was pain over the region of the liver posteriorly and also at the tip of the right shoulder. He had occasional attacks of vomiting and headache. His tongue was furred. There was a distinct bulging posteriorly over the liver region and there was also some œdema. The irregularity of the temperature suggested septicity and the diagnosis of tropical abscess of the liver having been made it was decided to operate. On the 10th an incision was made in the posterior axillary line, along the course of the eighth rib, and a piece of this being removed, the abscess was immediately reached. About 50 ounces of pus were let out. The cavity was irrigated with a 1 in 4,000 solution of biniodide of mercury and a large drainage tube was inserted. The pus was examined microscopically and found to consist of broken-down pus cells mixed with liver cells and fat globules, but no amœbæ coli or pyogenic cocci were found. As is usual in cases of tropical abscess of the liver no amœbæ coli were discoverable in the pus first let out, but on examination of that which was discharged three days after the operation, they were found in large numbers. The cavity quickly healed up, and the patient was discharged cured on March 21st, having gained 12 lbs. in weight.

Malaria.

Methylene blue (medicinal)	40 grn.
Euquinine	100 grn.
Powd. nutmeg	30 grn.

Put into 20 capsules. One, three or four times daily.
—*Merck's Archives*, May, 1903.

The Uses of Sodium Salicylate in the Treatment of Malarial Fever, by A. D. E. Kennard. *Lancet*, July 11th, 1903.—Dr. Kennard relates three cases of "fever" on board ship in which salicylate of soda was administered in the usual doses. The cases were supposed to be malarial in origin, although there was no confirmatory blood examination; the symptoms described by Dr. Kennard, the efficacy of sodium salicylate and the alleged uselessness of quinine, however, all point in the opposite direction.

Malta Fever.

T. y Pascual discusses Malta fever in the *Revista de Ciencias Median de Barcelona*, year xxviii., No. 11. He regards the fever as an endemic affection occasionally becoming epidemic. Our knowledge of this ailment is fairly complete as regards its bacteriology, clinical aspects and *post-mortem* appearances, but in other respects, especially concerning treatment, no advance has been made lately. Bruce discovered the *Micrococcus melitensis* in 1887; and he proved by the inoculation of healthy persons with pure cultures that the disease could be thus carried. Treatment of the patient's blood-serum with a pure culture of *Micrococcus melitensis* causes agglutination, generally within a few minutes. The peculiarity of the temperature curve during the illness has acquired for the disease the name undulating fever. The absence of visceral changes

except some enlargement of the spleen, is characteristic of the disease, both clinically and pathologically. No specific treatment is known, and quinine is by some regarded as injurious.

Mosquitoes.

The Papaya Tree as a Protection against Mosquitoes.—Mr. Shipley, in an article published in *Nature*, states that the leaves of *Ocimum viride* are instrumental in banishing mosquitoes. Another authority, Mr. Groom, also mentions that his dwelling, situated on an island and near the river, was almost unvisited by mosquitoes. An unbroken line of papaya trees, however, grew between his house and the river, and Mr. Groom attributes the freedom from mosquitoes to their presence. On one occasion when two of the trees had been blown down by a violent typhoon, the mosquitoes evidently invaded the house through the gap, as their number considerably increased. Mr. Groom frequently examined the papaya trees and observed that they were always entirely free from flies and other insects that abounded on the bamboos, bananas and other trees close by. It is possible that in the near future these observations may be turned to practical account by planting papaya trees around houses in the Tropics as a preventive of their invasion by mosquitoes.

Mycetoma.

Moriz Oppenheim, at the meeting of the Dermatological Association held in Vienna, January, 1903, exhibited specimens of the yellow and black variety of Madura foot. Oppenheim stated that he was of opinion that the fungus of the yellow variety is nearly related to *Streptothrix actinomyces*. He has never found the fungus itself in the black variety owing to the fact, he believes, that the fungus has perished. He is inclined to regard the black variety as only a later stage of the yellow.

Pemphigus Contagiosus.

The Micro-organisms in Pemphigus Contagiosus, by J. de Haan. *Archiv fur Schiffs und Tropen Hygiene*, July, 1903.—The author reports that he had the opportunity of frequently observing the acute eruptions of pemphigus contagiosis and of examining their contents, which at the initial stage consists of a perfectly clear fluid. He always found small cocci amongst the polynuclear and mononuclear leucocytes; the cocci were found either in pairs or agglomerated into small groups. The number of the polynuclear leucocytes was increased, and contained a number of microbes which were stainable by Gram's method. Gelatine was liquefied by the micro-organism.

Several animals were inoculated with cultures, but the results were either negative or reacted very slightly, thus demonstrating that these staphylococci possessed little virulence.

The author made experiments on human beings, himself amongst the number, and the results were either negative, or only induced a blister at the place of inoculation. The author has therefore come to the conclusion that pemphigus contagiosis is caused by the epidermis, relaxed by perspiration, being invaded by staphylococci, and that they possess but little virulence.

Plague.

Experiments with Plague Germs forbidden in Germany.—In consequence of the death of Dr. Milan Sachs on June 5th, 1903, from plague in Berlin, contracted during his researches at the Bacteriological Institute, the Government have issued a decree forbidding further experiments with plague germs.

Plague Operations in Allahabad.—Captain Fullerton, I.M.S., states that from his observations in Allahabad: "Disinfection with perchloride of mercury and hydrochloric acid has been tried in Allahabad City for two years, and has been systematically and successfully carried out. We have not been able to stamp out the plague, but its ravages have been undoubtedly checked. Its reappearance in disinfected blocks has been almost invariably due to imported cases. How long this preventive action may last it is impossible to state; but my opinion, at the end of two years' work in the city, is that disinfection by this method is preventive to a large extent, and that the results attending it commend it to the public opinion."

Bats and Plague.—In Naples, whilst plague prevailed there, it was found that bats were even more susceptible to plague than rats.

Quinine Idiosyncrasy.

A Case of Malaria presenting the Quinine Idiosyncrasy, by C. I. MacAlister, M.D., M.R.C.P. *Liverpool Med.-Chirur. Journ.*, June, 1903.—A case of malarial fever contracted on the West Coast of Africa by a sailor after one visit to the Coast, and in which æstivo-autumnal ring forms were present, and in whom quinine was tried by the mouth, by enemata, in the form of Warburg's tincture, with opium or phenacetin.

In whatever form the drug was given severe cinchonism developed in from half to three hours after administration. The greatest tolerance was observed when quinine was exhibited with opium. The opinion expressed at the meeting at which Dr. MacAlister's paper was read was that the amount of opium administered (10 minims of the tincture) was insufficient to counteract the untoward symptoms caused by the quinine.

Spleen.

Abscess of the Spleen, by Dr. Angelo Cipollina. *La Riforma Medica*, May 13th, 1903.—In abscess of the spleen Cipollina states that the fever induced is of a pyæmic type, and may be either continuous or remittent. The spleen may be but slightly enlarged, or it may considerably increase in size. The organ is painful, the patient lying on the back with the left lower limb drawn up. Surgical treatment gives the only hope of cure.

Yellow Fever.

Specific Gravity and Hæmoglobin Estimate in Yellow Fever, by A. D. Albertini. *Revista de Medicina Tropica*, May, 1903.

In the *Centralblatt für innere Med.*, July 13th, 1899, A. Plehn published his observations on the relation between the hæmoglobin and the specific gravity of the blood in malaria. Plehn demonstrated that the amount of hæmoglobin was in constant relation to the specific gravity, and that there was a strict parallelism between both.

The average specifiic gravty Plehn showed to be 1060 to 1063, corresponding to from 90 to 95 per cent. of hæmoglobin. Acting upon this basis, Albertini determined to study the relationship of the specific gravity and hæmoglobin in yellow fever. A favourable opportunity was afforded during the epidemic of the disease in 1900 in Havana. The result of the investigation has been that the specific gravity of the blood in yellow fever varies between 1058-60, and the hæmoglobin between 88-102 as an average, showing that the hæmoglobin is high or increased in yellow fever, and the specific gravity variable, ascending or descending without relation to hæmoglobin. The conclusions are :—

(1) That the specific gravity of the blood does not always preserve a constant relation to hæmoglobin, as it was believed on the supposition that they were mutually interdependent.

(2) That the red blood corpuscles do not appear to suffer in yellow fever, but great changes occur in the blood plasm produced by the bio-chemical reaction of the lisins and antilisins conferring immunity after mild attacks of the disease, or by concentration and dilution depending on the degeneration of the endothelium described by Finlay.

(3) That these easy and rapid methods may contribute greatly to a reliable clinical diagnosis.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
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5.—Correspondents should look for replies under the headi "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—AUGUST 1st, 1903.

Original Communications.

NOTES ON THE GENUS "STEGOMYIA" (THEOBALD), AND ITS DISTRIBUTION.

By F. V. THEOBALD, M.A., F.E.S.

THE genus *Stegomyia* ranks next to *Anopheles* and the related genera of *Anophelina*, on account of the part it plays in the distribution of yellow fever. How many of the species in this genus may be implicated we do not at present know; at present a single species only seems to be held responsible. That species (*S. fasciata*) is one of the two commonest West Indian and South American Culicids. Although *fasciata* is widely distributed in all tropical and sub-tropical countries, it does not occur in any numbers in certain parts, such as the Malay States, China, and in Africa. Where it does not occur in abundance it is nevertheless represented by closely-allied members of the genus, such as *Scutellaris* in the Malay States, China, &c., and *Africana* and *argenteopunctata* and others in Africa. It is quite possible that the latter species and the common Australian *notoscripta* might play the same *rôle* as *fasciata*, given a sufficient yellow fever grazing ground. The genus seem to have a decided preference for the littoral. The genus was separated from *Culex* entirely on account of the scale structure of the head, thorax and wings; and as has been recently shown, there is as much structural difference in the larvæ of the two genera. In regard to the eggs (if records are correct) there are, however, discrepancies, for *fasciata* and *scutellaris* lay their eggs singly, but, according to Skuse, those of *notoscripta* are deposited in "rafts." Little is known, however, of the life-history of any members of this genus except in *fasciata*.

From information I have been able to collect they all seem to be vicious bloodsuckers, and this habit does not only seem to be confined to the females. The reports of the males being bloodsuckers require further investigation, however. These insects bite both by day and night, and in all, the bite alone is most annoying, irrespective of the insects possibly carrying yellow fever. It is in this genus that we find special predilection for settling, when at rest, on dark objects and clothing. They have been popularly known us "tiger-mosquitoes," on account of their banded and striped appearance; but a glance at the synoptic table will show that that name is misleading as many members of the genus are unbanded or unstriped. They are, however, mostly small, dark gnats, with white, silvery, or yellow lines, bands, or spots on the thorax and legs (*fasciata*, *sugens*, *&c.*), or they may be unadorned (*nigricephala*, *&c.*). The largest species is *crassipes* (4·8 to 5 in.), an aberrant form of a more general brown hue than the rest, and *grantii*, which is often as large; but both can at once be told by the flat head and scutellar scales. They mostly seem to be more or less connected with man, some being exclusively domestic, others only partially so. Certain species (as *fasciata*, *scutellaris*, *notoscripta*, *&c.*) are found not only in houses, stables and sheds, but also on ships and trains, and are doubtless distributed with the *Culex fatigans* in that manner.

Longevity of Adults and Eggs.—Through the kindness of Dr. Finlay I received, last year, some ova of *fasciata* from Cuba. They were sent dry in a tube, and were left for two months after arrival. As an experiment they were placed in some tepid water in my greenhouse, and all the fifty eggs hatched within twenty-four hours, and from these several adults hatched out. Further, these adults were kept for two months without food of any kind, but with moisture, and at the end of that time, not having been supplied with water, they died during my absence from home.

Pairing of S. fasciata takes place in sunshine; the male invariably gets under the female, who may or may not carry him off and complete the process in the air. The males fertilise a large number of females, never tiring, according to Dr. St. George Grey's observations.

The genus is certainly a remarkable one in many respects, but most of all in regard to the wide distribution of the type species, *S. fasciata*. The original home of this species is undoubtedly the West Indies and the north of South America, where it is most abundant, most vicious, and of greatest importance in regard to the part it plays in the dissemination of yellow fever.

Fortunately, being an almost exclusive tub and pot breeder, it can be more easily dealt with than the various *Anophelina*, which have wider breeding grounds.

At present there are twenty-two species described: I have seen all but one of these (*Signifer coquillett*). Another new species, too broken to describe, was sent me by Dr. Sergent from Algeria, and one by Dr. Lutz from Brazil, that I have had the misfortune to mislay. Miss Ludlow is describing another new species from the Philippine Islands (*S. Amerii*), so that there are known to really exist twenty-five species, all of which are easily identifiable on account of their striking thoracic and other ornamentation.

The known species may be easily distinguished by the following synoptic table:—

SYNOPTIC TABLE OF *STEGOMYIA*.

A.—PROBOSCIS BANDED.

1. Thorax with five silvery and yellow lines ... ... *notoscripta*. Skuse.
2. Thorax unadorned; black, with yellow-golden scales ... ... *periskeleta*. Giles.

B.—PROBOSCIS UNBANDED.

(*a*) *Legs basally pale banded.*

β. Abdomen banded basally.

3. Thorax with two median yellow lines and lateral silvery curved lines; unguis of ♀, serrated ... *fasciata*. Fabr.
4. Thorax as in 3; unguis of ♀ simple *signifer*. Coquill.
5. Thorax with two short median pale lines in front, and a pale spot on each side of them ... ... *nigeria*. Theob.
6. Thorax with narrow median white line forked in front of scutellum, a fine curved lateral pair, and a short pure white one below on each side ... ... *grantii*. Theob.
7. Thorax with two median yellow lines and two pale creamy lateral lines in front ... ... *sexlineata*. Theob.
8. Thorax with one silvery median line, and lateral curved lines ... *scutellaris*. Walk.
9. Thorax with five white spots ... *sugens*. Wied.

ββ. Abdomen unbanded.

10. Thorax with two pairs of lateral oblique silvery bars ... ... *africana*. Theob.
11. Thorax with a broad patch of white scales on each side in front, and a median pale line ... ... *terrens*. Walk.

(*aa*) *Legs apically banded.*

12. Thorax with two prominent and two pallid spots... *marshallii*. Theob.

(*aaa*) *Legs apically and basally banded.*

β. Abdomen with basal white bands.

13. Thorax with median white line, a large lateral curved one, a small straight white one on each side of median line in front, and another on each side behind ... *pseudotæniatus*. Giles.

ββ. Abdomen unbanded, with white lateral spots.

14. Thorax with round median white spot in front, two lateral white areas, median area prolonged downwards laterally ... .. *gubernatoris*. Giles.

(*aaaa*) *Legs unbanded.*

β. Thorax adorned.

15. Thorax with four brilliant white spots ... ... *argenteopunctata*. Theob.
16. Thorax with two pale spots and two median pale lines *minuta*. Theob.
17. Thorax with two dark spots; head white ... ... *albocephala*. Theob.
18. Thorax with front half silvery ... *nivea*. Ludlow.

ββ. Thorax unadorned.

19. Abdomen with basal bands ... *irritans*. Theob.
20. Abdomen with apical pale bands ... *crassipes*. V. d. Wulp.
21. Abdomen with basal lateral white spots ... ... *nigricephala*. Theob.
22. Abdomen with apical white lateral spots ... ... *punctolateralis*. Theob.

NOTES ON DISTRIBUTION OF SPECIES.

(In nearly all cases the species are found over a wide area around the locality given; where otherwise, it is mentioned in each species.)

1. *Stegomyia notoscripta*. Skuse.

This species has, so far, only been found in Australia. Specimens have been sent from Queensland, where it seems to

be abundant. It is also common in New South Wales, and has been also sent from Victoria and South Australia. It is a household form; but Dr. Bancroft has found it biting in jungle. The *larvæ* breeds in water-butts. It is one of the common annoying *Culicids* of Australia. We may expect it to occur elsewhere.

2. *Stegomyia nigeria.* Theobald.

A single specimen only has occurred. Taken at Bonny, West Africa. Evidently rare.

3. *Stegomyia grantii.* Theobald.

So far only recorded from Sokotra, where it is abundant and very annoying.

4. *Stegomyia sexlineata.* Theobald.

A very marked species, so far represented by a single ♀ from Trinidad.

5. *Stegomyia scutellaris.* Walker.

A very abundant species in parts of India, Malay States, East Indies, China, Japan, &c. It bites very severely, and occurs in and around man's habitations. It will probably prove to be a yellow fever carrier. It has been sent frequently as *fasciata*, but can at once be told by the single silvery median thoracic line.

The following are its recorded localities:—

India.—Ceylon; Madras; Canara district, Goa; Centr l Provinces; Naini Tal.

Malay States, &c.—Selangor; Penang; Perak; Singapore; Siam.

China.—Hongkong; Foo-Chow; Shaohyling.

East Indies.—Borneo; Celebes; Amboina, and British New Guinea.

Other Islands.—Seychelles; Formosa; Japan; Fiji, and Mauritius.

6. *Stegomyia fasciata.* Fabr.

The most widely-distributed member of the *genus*. Previously described under a variety of names. Essentially a domestic form, and bites with severity. The male, as well as the female, *said to bite*. This species is found in houses, tents, stables, ships, trains, &c. It is subject to considerable variation in size; but the thoracic markings are constant, except in the variety *mosquito*, in which the two median pale lines on the thorax are almost or quite obliterated. It does not seem to occur further north or south of line 43°.

The following are its recorded localities:—

India.—Ceylon; Travancore; Madras; Central Provinces; Calcutta.

Malay States, &c.—Siam; Perak. (Apparently rare, and represented by *scutellaris*.)

East Indies.—Celebes and New Guinea.

Palestine.—A few specimens recorded.

Japan.—A single specimen.

Australia.—Queensland; New South Wales; Victoria and South Australia. Known here as *Culex Bancroftii*. From the malarious uplands of Victoria it has been sent in numbers, but no *Anopheles*.

Africa.—Sierra Leone; Lagos; Nigeria; Gambia; Senegambia; Old Calabar; Mashonaland; Pretoria; Durban; Nairobi; Zanzibar; Port Said; Zomba, British Central Africa generally; Uganda.

North America.—Savannah; Georgia, &c. Abundant in southern parts of the States, and as far north as Atlantic coast at Virginia.

South America.—British Guiana; British Honduras; French Guiana; Demerara; Panama; Brazil; Argentine Republic.

West Indies.—In all the islands.

Europe and Mediterranean Islands.—South Italy; Spain; Portugal; common at Gibraltar; Cyprus; Crete.

Oceanic Islands—Fiji; Seychelles; Mauritius; Bermuda.

Stegomyia periskeleta. Giles.

The only locality known for this species in Shajahanpur, N.-W. India. Evidently rare.

Stegomyia africana. Theobald.

Fairly common in West Africa. Recorded from Sierra Leone; Lagos; Old Calabar; Zomba, and Mashonaland. (Evidently rare in the two latter places.)

Stegomyia sugens. Wiedemann.

Apparently rare, but widely distributed. Occurs in Sierra Leone; Mashonaland; Nubia, and Corsica.

Stegomyia argenteopunctata. Theobald.

Recorded only from Mashonaland.

Stegomyia minuta. Theobald.

A single specimen known only; from Mashonaland.

Stegomyia albocephala. Theobald.

A single male only known; from Gambia.

Stegomyia nivea. Ludlow.

Apparently limited to the Philippine Islands.

Stegomyia marshallii. Theobald.

So far recorded only from Mashonaland and Gambia.

Stegomyia pseudotæniata. Giles.

Occurs in the hills in India, up to 8,000 ft.; Bakloh, Punjaub. Naini Tal (7,000 ft.); Himalayas (8,000 ft.).

Stegomyia gubernatoris. Giles.

Represented by a single female from Allahabad, India.

Stegomyia irritans. Theobald.

So far found only at Bonny, West Africa.

Stegomyia crassipes. Van der Wulp.

Burmah and the Indies. No recent records.

Stegomyia nigricephala. Theobald.

Recorded only from Bonny, West Africa.

Stegomyia terrens. Walker. South America.

The type only has been recorded.

Stegomyia puncteolateralis. Theobald.

Bred by Dr. Bancroft in Queensland. Bites. Striking white scales; prothoracic lobes with black line behind.

It will thus be seen that, as far as we know at present, only three species are very abundant, namely, *fasciata*, *scutellaris*, and *notoscripta*. The only two species with a wide distribution are *fasciata* and *sugens*.

The genus does not occur, as far as we know, outside 43°, but we may expect it to occur anywhere within 43° N. and 43° S.

If, of course, *calopus* (Meigen) is *fasciata* (Fabricius), then it has occurred in England; but I am extremely doubtful upon this point, so many errors have been made in identification and the confusion of synonomy.

The species that seem to be most important after *fasciata*, in regard to "yellow fever," are *scutellaris* and *notoscripta*, both of which, being very closely related to the *fasciata*, might prove to be carriers of the disease.

A new genus closely allied to *Stegomyia* has recently been found in Australia. This I have called *Macleaya* ("Entomologist," p. 154, 1903). The head has a few median narrow curved scales and the lateral lobes of the scutellum also have the same. A single species only occurs (*Macleaya tremula*, Theobald).

OCIMUM VIRIDE AND MALARIA.

J. M. Atkinson, M.B.Lond., Principal Civil Medical Officer, Hong Kong, in a letter addressed to the Editors of the Journal of Tropical Medicine, remarks:—

"I have been very much interested in the correspondence which has recently appeared in the press at home concerning the anti-malarial properties of the plant '*Ocimum viride*.' This plant is a native of the West Coast of Africa, and glowing accounts have appeared as to its presumed anti-malarial properties.

"Although it does not grow in Hong Kong it belongs to the same genus as the well known pot herb 'Basil,' which is cultivated here.

"Professor Groom, formerly lecturer on botany at the Imperial Naval College at Whampoa, China, has written one article recently, referring to the anti-malarial properties of the 'Papaw' tree. He mentions that during his stay in China he never saw any insect whatever on these trees.

"This tree is very common here, and its well-known digestive properties are much appreciated, but on one of these trees recently two species of fly and one of ant were found.

"The castor oil plant has also had its turn as being anti-malarial.

"Undoubtedly the eucalyptus possesses anti-malarial properties, due, I take it, partly to the essential oil contained in its leaves, but chiefly to the property it possesses of converting swamps (breeding places for mosquitoes) into dry land.

"If a plant could be found which possesses all the properties ascribed to the '*Ocimum viride*,' it would prove a great boon to the long-suffering residents in the Tropics, whose midnight slumbers are often disturbed by these tiresome pests (mosquitoes), not to mention the flying cockroaches and numberless vermin which infest these regions.

"An attempt is to be made to grow this plant here, but I very much doubt whether it possesses such wonderful properties as have been described.

"I should not be surprised were the old 'Upas' tree to be trotted out as an anti-malarial agent.

"*Hong Kong*,

"*June* 13*th*, 1903.'

A New Blood Stain, by G. L. Laporte. *Medical Record*, June 27th, 1903.—Laporte has introduced a blood stain of value in malaria, inasmuch the body of the parasite is stained blue and the chromatin a bright carmine. The stain is a modification of Jenner's and consists of two solutions, (1) an unfiltered ½ per cent. solution of Jenner's powder in methylic alcohol; (2) one part of Unna's polychrome methylene blue solution to 150 parts distilled water.

The method of applying the stain is as follows:—

"Take the cover-glass specimen in a Cornet forceps, drop upon it five drops of the Jenner stain and allow it to act one minute, then, without removing the Jenner's stain, pour on ten drops of the polychrome methylene blue solution. Agitate the forceps so as to produce a thorough mixing of the two solutions on the cover-glass. Allow the combined stain to act five minutes longer. Then wash off with distilled water and allow some of this to rest on the cover-glass about one minute longer, with occasional agitation of the forceps. At the end of this time rapidly dip the specimen into a very dilute acetic acid solution (about one drop of 50 per cent. acetic acid solution to 10 ounces of water) until it is of a reddish or pinkish colour. Rinse in water and dry in air. Do not employ heat or filter paper to dry specimen."

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THE

Journal of Tropical Medicine

August 1, 1903.

THE BRITISH MEDICAL ASSOCIATION AT SWANSEA.

The Section of Tropical Diseases.

A most successful gathering of those interested in Tropical Medicine was held at Swansea under the Presidency of George H. F. Nuttall, M.D., Ph.D., Cambridge. It was not originally intended by the Local Committee at Swansea that a Section of Tropical Diseases should be held, and there was some considerable delay in persuading the authorities to give way. It may also be remembered that there was the same difficulty before the Manchester meeting last year. To those interested in Tropical Medicine, and therefore for the most part resident abroad, it is difficult to understand the apparent apathy of Local Committees; but it is difficult to bring the dwellers in the British

sles to recognise the fact that there are some ,000 British practitioners living outside the omeland, and who are keenly interested in he Empire's medical needs.

The success of the meeting at Swansea was so ronounced that there can be no question urely in the future as to the inclusion of Tropical Diseases in the category of subjects to be dealt ith at these meetings. As the President aptly emarked, any medical congress in which the iscussion of Tropical Disease did not form a art could not be considered representative of nodern medicine. Altogether 117 attendances vere registered during the sitting of the Section f Tropical Diseases; nor did the interest flag, or on the last day of the meeting the room in hich the Section met was full to overflowing. Ve congratulate Dr. George Nuttall, the President, and the Honorary Secretaries, Dr. G. C. ow and Captain Leonard Rogers, I.M.S., upon he great success of the meeting they so skilully organised and conducted.

The next meeting of the British Medical ssociation is to be held at Oxford. The central tuation of the ancient University town, its storic and classic traditions, are sure to attract large gathering, and we hope that those inrested in Tropical Diseases will gather in 1904 ith as much enthusiasm as prevailed at the eeting at Swansea in 1903.

British Medical Association.

SECTION OF TROPICAL DISEASES.

Wednesday, July 29, 1903.

ABSTRACT OF PROCEEDINGS.

THE PRESIDENT, George H. F. Nuttall, M.D., Ph.D. mbridge), congratulated the Council of the British dical Association upon preserving the Section of opical Diseases when there seemed some doubt of continuance. He regarded the Section as one of highest importance. In this department of medie some of the greatest and most practical results ve been achieved in the whole history of medicine. study of tropical ailments afforded an unequalled d of inquiry, and a meeting of the British Medical ociation, or any other general medical gathering devoted to the study of disease, could not be considered complete without including tropical diseases in its scope. Dr. Nuttall stated that we could in this country help to elucidate tropical ailments by a more careful study of several diseases, more especially those met with in animals. He drew attention to the fact that there was much to be learnt from studies conducted in temperate climates upon parasites having a similar life-history to those which prevail in the Tropics. As an example he mentioned having found *Filaria stomoxeos* (von Linstow) in the head of *Stomoxys calcitrans* in England, and apparently the larval forms present in the blood of cattle. Studies on such parasites made under the favourable conditions we find in laboratories at home may be of considerable assistance in acquiring a better knowledge in tropical parasites, which have often to be studied under unfavourable conditions. Similarly many questions in the biology of mosquitoes and the like can be solved by home-workers.

THE DISPOSAL OF SEWAGE IN THE TROPICS.

I.—Professor W. R. SIMPSON, F.R.C.P., opened the discussion by a paper entitled "*Disposal of Excreta in the Tropics.*"

In the Tropics, Professor W. R. Simpson stated, the disposal of sewage assumed a wider meaning than in Britain, and included its collection, removal and purification. The Chinese are probably the most careful of all nations in the collection, removal and disposal of excreta, whilst they are perhaps the most careless in the removal and disposal of garbage and sulliage water. The reason of the excreta being dealt with so carefully is the manurial value attached to the excreta. The latrines are over cemented cesspools, where the contents seem to undergo bacterial changes similar to those we know to take place in the septic tank recently introduced in Britain. It is seldom fresh excreta are employed; the farmer or gardener has a cesspool storage from which he from time to time removes the contents as they are required for manure.

Professor Simpson holds that the land is the final and proper stage for the disposal of excreta, that preparatory changes in the excreta before it is applied to the land are advantageous, and that waste and pollution of the soil by excreta in villages can be prevented by placing public latrines over raised and well-cemented cesspools, protected from flood water. It is the collection and removal of excreta which are so manifestly defective in the Tropics, yet in dealing with these it is better to try to improve what is defective in the old systems understood by natives than to bring about a radical change by introducing purely European methods of disposal. The most pressing improvements seem to be protection of the latrine and the receiving pail from rain water. It is easy to calculate the number of pails and carts required for the removal of the excreta in a given population, but when rain and flood water gains access the volume is such that it is impossible to calculate the number wanted, and hence the overflowing pails and carts and the pollution of the soil. It may be stated generally that a town of over 10,000 or 15,000 inhabitants requires to have a system of pipes to remove the excreta. For such towns a pail system,

so arranged that the sewage can be emptied into conveniently placed depôts in different parts of the town, and a system of pipes laid to the outfall is required. When the excreta are buried in trenches the chief trouble is not in the trench itself, but the want of care in cleansing the utensils employed in conveying the excreta to the trench. Professor Simpson had never been able to trace disease to the trench itself.

II.—Andrew Duncan, M.D., M.R.C.P., Lt.-Col. I.M.S. (retired), read a paper on "*The Disposal of Sewage in the Tropics.*"

Dr. Duncan advocated the measures recommended by Dr. Vivian Poore in his book on "Rural Hygiene" for the disposal of sewage in the Tropics. The excreta must not be buried too deeply, nor should any antiseptic be used. Earth closets are employed, the earth being previously sifted and stored, but not artificially dried. The surface layer of soil should be used, as if it is taken from a considerable depth from the surface it is apt to be comparatively sterile. Excreta are to be removed and buried in shallow trenches daily, and the ground subsequently cultivated. Colonel Hamilton, I.M.S., followed this method in Almora, India; the excreta of the barracks were buried in the hospital compound with success. In India, however, the excreta must not be buried too superficially, otherwise there is danger of the birds scratching the surface and exposing the excreta. When typhoid bacilli is treated in this way there is a danger of the soil becoming infected, in which case the best method of disposal would seem to be incineration.

III.—Leonard Rogers, Capt. I.M.S., read a paper on "*The Influence of the Septic Tank in Pathogenic Bacteria.*"

In carrying out bacteriological investigations in connection with this subject, Captain Rogers proceeded to separate the organisms present in the septic tank effluent from the fluid in which they live, and to test the action of the sterile effluent on various pathogenic bacteria under anaërobic conditions, in order to see how far the chemical conditions were injurious to the added organisms. He also intended to isolate some of the organisms which are present in largest numbers in the tank, and add these severally to the sterile effluent, together with pathogenic organisms. Experiments were conducted with typhoid bacillus, the comma bacillus of cholera, anthrax bacillus, staphylococcus, streptococcus, micrococcus melitensis, bacillus of dysentery, and the plague bacillus.

Captain Rogers found that the septic tank process is inimical to most of the pathogenic organisms tested, with the exception of the anthrax bacillus.

Discussion.

H. M. Fernando, M.D., B.Sc.(Lond.), Columbo, considers that there are objections to the pail system for fair-sized towns in the Tropics owing to the frequent ablutions performed by natives, as a large amount of excreta finds its way into the compound in the neighbourhood of the pail, thereby causing surface pollution. In regard to irrigation by human excreta, several sects of natives object to cereals and vegetables grown in soil thus treated, and even refuse to give the products of such soil to their animals.

W. B. Clarke, M.B., Barbados, stated that in Barbados the septic tank system has been in use for a considerable time. The soil of Barbados is a porous limestone, and the result of storage is that the contents of the tank disappear into the soil. He cited an instance of typhoid fever being communicated to a number o persons by the opening of a trench in which typhoi excreta had been buried twelve months previously Dr. Clarke is anxious to obtain information concernin the effects of sunlight on the contents of septic tanks but hitherto he has obtained no information.

P. W. Bassett-Smith, Fleet-Surgeon R.N., drew attention to the wide-spread diffusion of the ova o intestinal parasites by the application of sewage to th land.

Sir Patrick Manson, K.C.M.G., F.R.S., describe the very efficient method the Chinese followed in dea ing with their excreta. The addition of water to th excreta was carefully guarded against; and althoug the Chinese had no scientific means of ascertaining th specific gravity of this marketable commodity, th quality of the material was tested by urine-taster men who actually tasted the fluid to ascertain i quality.

F. M. Sandwith, M.D., F.R.C.P., London an Cairo, said that his experiences in Egypt had lessene his objections to the cesspool system for hot countrie The cesspool, however, should be watertight, and th contents removed by a pump and tube. He had en deavoured to get the authorities in Egypt to intr duce a water drainage system, yet he had never know any cases of epidemic disease to arise from cesspools.

J. Cantlie, M.B., F.R.C.S., London, mentioned th the pail system was followed in Japan as well as China with excellent results. He wished a clear definition had been given of the difference betwe a cesspool and a septic tank. Unless the septic ta were absolutely watertight there seemed the san objection to the tank system as to the cesspool.

L. Sambon, M.D. (Naples), London, said the p and cesspool system had been in use in Italy fro the time of the ancient Romans. The sewage from t cesspool is applied to the land as manure. He point out the difficulty of washing vegetables so as to fr them from typhoid and other germs, and consider that fresh vegetables from soil so manured could n be eaten with impunity.

A. T. W. King, Capt. I.M.S., stated that priva latrines in India are so prevalent that the septic ta system cannot be thoroughly carried out.

I. Penny, Major I.M.S. referred to the introducti of the pail system in Burmah with great success.

C. Christy, M.B., Liverpool, said that the dispo of sewage may be dealt with in the Tropics by cineration or used as manure; the latter method attended with great danger from dust and fli. He had seen the excreta disposed of in trench, and not covered over, and in consequence the tren swarmed with flies.

K. W. Goadby, M.R.C.S., London, considered th a septic tank could be properly constructed by e

puddling the sides and bottom of an ordinary cesspool. Most pathological bacteria are preserved at their greatest virulence under anaërobic precautions, hence the passage of the effluent over the aërobic filters may tend to destroy those pathogenic bacteria which may have passed through the septic tank.

G. H. F. NUTTALL, M.D., Ph.D., Cambridge, stated that all experiments in regard to sunlight depend on the thickness of the layer the light has to traverse. Sewer gas is bacteriologically pure. He agreed with Dr. Sambon that vegetables treated with human excreta should not be eaten raw. Ravenal in Philadelphia found anthrax distributed by spores after passing through septic tanks. As a means of combating the outbreak of typhoid in the U.S. Army during the late war, Reed had insisted upon doing away with open cesspools in the camp and receiving the excreta in closed tanks, with the result that typhoid fever disappeared from amongst the troops.

SPRUE.

P. W. BASSETT-SMITH, Fleet-Surgeon R.N., read a paper entitled "*Sprue: Primary and Secondary; with Special Reference to the Blood Changes found, with Illustrative Cases.* The author stated that although few cases of sprue appears in the return from H.M. fleet in the China seas, yet the disease does occur amongst the sailors in that fleet occasionally. Climatic influences have undoubtedly much to do with the causation of sprue, and it is certain that residence in the far East is generally associated with the occurrence of the disease. According to Manson, the higher the temperature of the locality the more serious is the type of the disease. The United States Army Surgeons, from experiences gained in the Tropics, are of the opinion that sprue is not a specific disease, but a post-dysenteric condition. They ascribe the disease to certain definite forms of bacilli belonging to the colon group, which they succeeded in isolating. Bassett-Smith states, however, that sprue occurs without previous dysenteric attacks. He believes the disease is a form of chronic inflammation of bacterial origin, giving rise to a diminished supply of those nitrogenous products which are required in the formation of the red cells. The anæmia of this disease is so pronounced as to resemble pernicious anæmia, except that the hæmoglobin value of the cells is also reduced and megaloblasts are not present.

Post mortem.—The most marked evidence is thinning of the gut, with destruction of the mucous membrane and its absorbent glands. In one case decribed by the author of the paper, examination of the blood showed excessive changes, a count giving only 1,000,000 red cells and 2,960 white cells per cubic mm.

The paper was accompanied by charts of temperature, &c., a table of blood counts, a diagram of a blood film, microscopic specimens, and a spirit specimen of the gut showing the excessive thinning.

Sir PATRICK MANSON stated that in regard to treatment it was not desirable to stick to one form of diet; when milk did not succeed a meat diet should be tried, and when neither proved of value strawberries should be given. The arsenate of iron administered hypodermically had proved of undoubted value.

W. B. CLARKE, M.B., said that sprue was common amongst natives of Barbados, and stated that towards the end of the disease there was a tendency to pigmentation of the skin and to lunacy.

G. C. LOW, M.B., did not consider that the disease named sprue in the West Indies was the same disease as that met with in the far East. The condition described by Dr. Clarke seemed to be of the nature of pellagra.

J. CANTLIE, M.B., said that he had recommended the "meat" treatment of sprue some five years ago at a meeting of this Section. At that time he had few followers, but he now found that a "meat" treatment was more generally resorted to. He had no doubt of the benefits accruing to a meat in preference to a milk diet. The diet, whether of fresh milk, fresh meat, or fresh fruit all seemed to point a scorbutic element present in sprue.

REPORT OF THE MALARIA EXPEDITION TO THE GAMBIA, 1902, OF THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

By J. EVERETT DUTTON, M.B., B.Ch.Vict.

With an APPENDIX by F. V. THEOBALD, M.A.

THE Liverpool School of Tropical Medicine has just issued a most important and practical report upon the prevention of malaria in the Tropics. Dr. Dutton who conducted the expedition with conspicuous success shows with striking clearness how a great deal of disease is due to the want of knowledge of the nature of malaria, and that during the dry season the residents are largely to blame for the appearance of the disease. It is one of the most hopeful reports ever issued by the School, and it shows that the Governors and others in authority upon the coast are fully alive to the importance of stamping out malarial diseases. The report is an immense step forward in preventive medicine.

The object of the Expedition was to investigate the condition under which mosquitoes propagated in the town of Bathurst, and at the principal stations of the Colony, and to suggest methods of destroying these insects.

Malaria was found to be prevalent in the Colony; 80 per cent. of the native children examined harboured malarial parasites in their blood. The liability to infection of the Europeans occurs soon after the rains are established, lasting up to the end of November. The various breeding places of mosquitoes are described in detail in Chapter IV. of the Report, particular mention being made of the wells, canoe boats, lighters, cutters on the foreshore, and of grass-clogged trenches in many of the streets, which together supply Bathurst with the majority of its mosquitoes during the wet season and for part of the dry season. The number of mosquito breeding places present in the compounds was found to vary with the social position of the occupier. They increased in extent and number in proportion to the wealth and position of the occupier.

An account of the examination of one of the large compounds illustrates to what extent mosquitoes are bred by the white man in the Tropics on his own premises.

In one factory yard were found six barrels, and in the garden there were seventeen tubs and eight small wells, in which were bred quantities of Culex, Stegomyia, and Anopheles mosquitoes. Besides these dry season breeding places, discarded domestic utensils were scattered about the yard and garden, which in the wet season would have acted as breeding places.

It is pointed out that during the dry season from November to May natural breeding places for mosquitoes in Bathurst cease to exist and from this period the people breed mosquitoes solely in their own compounds.

In Chapter V., which deals with the prevention of malaria in Bathurst, a campaign against the mosquito is advocated; the town is judged especially suitable for its success. Thus Bathurst is situated on a practically isolated piece of land surrounded on nearly all sides by a broad expanse of water. The amount of land to be dealt with is comparatively small, viz., about a square mile. The surface is fairly level, sandy, absorbing water readily. In this area the breeding places of mosquitoes are a known quantity, the artificial, or those made by man, being in excess of the natural. The rainfall is very small and rain occurs only during four months of the year.

The probability of the introduction into Bathurst of yellow fever from Senegal is pointed out as another reason for attacking the mosquito.

The expedition was invited by His Excellency the Acting Governor, H. M. Brandford Griffith, on the part of the Colonial Government, to enter upon a crusade against the mosquito, and on November 18th the preliminary removal of rubbish from houses and compounds began, a sanitary inspector was appointed and received special instructions in the work. Under him worked a gang of labourers, and at the time of the departure of the Expedition, January 10th, 363 houses and compounds had been inspected. From these 131 cart-loads of old tin pots and other rubbish were removed. On the return of His Excellency the Governor, Sir George C. Denton, the Inspector and a sufficient staff of labourers were appointed permanently, and a grant of £200 per annum was given for the special anti-mosquito work. Anti-mosquito regulations have been drawn up by the Colonial Government. These are given at the end of the report.

An appendix by F. V. Theobald, M.A., is attached to the Report, in it are described the various species of mosquitoes collected by the Expedition, many of which were new to science.

Mosquito Bites.—The best way to treat mosquito bites, according to an observer writing to the *Hospital*, July 18th, 1903, is to "mix with half a pint 1 × 20 carbolic, four ounces 4711 Eau de Cologne," and dab the bitten parts with the lotion at once and frequently during the day.

THE SYSTEM OF DRAINAGE AND SEWERAGE (DOMESTIC AND MUNICIPAL) BEST SUITED FOR TROPICAL CLIMATES.

By J. W. Cornwall, M.A., M.D.(Cantab.).
Captain Indian Medical Service.

The differences between tropical towns are even wider than between the cities of civilised nations. In the case of the latter it is the position which mainly influences the choice of a system; towns near a large river or a sea have fewer difficulties to contend with than those far inland; those that are built on a sloping ground find themselves better off than towns on a dead level. Even in temperate regions experts are unanimous in the opinion that no one system can be universally applicable, but that local conditions must be carefully studied before any recommendations can safely be made. Much less, then, can it be expected that one system can be devised which will suit equally well all tropical towns, without at least most profound modifications to render it locally possible and acceptable. In a tropical town not only have such general matters to be considered as quantity and quality of sewage, contour of land, rainfall and temperature, but local customs, traditions and superstitions have also to be reckoned with and allowed for. The designer can never for a moment afford to forget the fact that he is providing for, frequently, a very mixed population, the bulk of whom are illiterate, totally incapable of looking at anything from the point of view of the educated, credulous to a marvellous degree, at the same time in other directions hopelessly incredulous, and, above all, exceedingly poor.

Points not always realised by Europeans dealing with native races are that they are, as a whole, utterly devoid of ambition, and have little desire to better their condition as long as they can obtain the few necessaries of life without too sustained effort; that when they have earned enough money to provide themselves with their accustomed luxuries, they usually abstain from work until it is exhausted; that they resent any change or interference with their habitual mode of life; and that they are endowed with a fund of passive resistance which has wrecked many a scheme of improvement.

The prominent thought, then, in the evolution of any scheme must be that the municipality has probably very little to spend, and that the individual units are likewise too poverty-stricken to be able to do anything for themselves; leaving out of account altogether any consideration of their willingness to assist, and of local enactments by means of which pressure might be brought to bear on the comparatively few who are in fair circumstances. We have to find means of collecting and disposing of—

(1) Excreta, solid and liquid.

(2) Sewage, *i.e.*, house washings, latrine washings, and other sources of foul liquids.

(3) Liquid waste from factories, large and small.

(4) Storm water.

(5) "Silt," *i.e.*, the mixture of mud and sand and putrescible organic *débris* deposited in drains.

No system can be considered complete which does

not take cognisance of house refuse and street sweepings, the proper collection and disposal of which is as equally important as the disposal of liquid waste, particularly in the Tropics, where decomposition sets in so rapidly and high winds play a part in the dissemination of matter which cannot be overlooked. Under heading (6), therefore, will be considered the collection and disposal of "rubbish."

(1) Excreta. (*a*) *Solid.*—First of all must be borne in mind the fact that persons whose diet is largely vegetarian pass a much larger bulk* of fæces daily than do meat-eaters, and more often than not they are constrained to relieve themselves twice a day when in normal health. The fæces, too, are rarely solid, and consisting as they do of a soft, pultaceous mass, they decompose and become offensive far more rapidly than the firmer excreta of meat-eaters. Indeed, the contents of a cart of excreta collected from a public latrine by the time it has reached the trenching ground or site of disposal is a thick liquid which can be poured.

Feelings which are inherent in a naturally rural population, as yet scarcely drilled to urban ways, prompt them to give preference to any field or garden as a *place d'aisance.* When these are not forthcoming, open ground and by-lanes are used before any latrine. Only thick traffic and police keep the more frequented highways free from nuisances of this sort; native public feeling hardly enters the question. If a house has only one latrine the master will not allow his servants to use it; they have to do the best they can for themselves somewhere outside. The notion that the excreta of young children cannot contaminate is pretty widely spread, and they are therefore seldom discouraged from relieving themselves on the doorstep, in the street, or wherever they may feel inclined.

(*b*) Even less, naturally enough, is thought of urine. Few men at least will hesitate to squat down by the roadside wherever they may be when the desire overtakes them, quite oblivious of the presence of all passers-by. The powerful sun and rapid evaporation usually keep a corner fairly free from odour even when it happens to be a place somewhat frequently used as a urinal. Similarly desiccation and burying beetles, not to mention less natural agencies, such as ill-fed pigs and buffaloes, continue in speedily removing fæcal deposits from view, unless, of course, they are on hard metalled or paved surfaces, or otherwise inaccessible spots.

(2) Sewage is a liquid of varying composition in the Tropics, but is usually more highly concentrated than in Europe, even though it does not generally contain the greater part of the fæcal matter. The richness of the fluid in organic matter depends on the quantity of water available to the householders. If there be a public water supply with internal house connections and fountains in the streets, the quantity of water allowed to run to waste will be enormous compared with that actually put to some definite purpose, and this is a loss that cannot be completely controlled by meters on house connections or the attachment of devices to regulate the delivery from street taps. A native will turn on a street tap, use twenty gallons to sluice his legs and feet, and depart with satisfaction, but heedlessly leaving the tap running full. Though scores of people may pass, not one will even think of stopping the flow, which continues perhaps for half an hour, perhaps all night. If the people have to draw water from wells in their houses they naturally do not trouble to lift much more than they actually require, and the waste is correspondingly small. Still less water is used in those places where houses do not possess private wells, but the women have to fetch it in pots from a tank or public well at some distance. Pipe water supplies are not, however, as a rule, so bountiful that sewage becomes more unduly diluted by all this waste; either the quantity is insufficient and the supply intermittent, or the pressure is too low to raise the water in the higher parts of the town at the hours when most of the taps are open in the low lying-parts, or the distribution is not extensive enough to allow everybody to get much more water than they actually need. Whatever the causes may be, whether municipal poverty or small rainfall, it is not often that the average number of gallons per head used or available is as great as in Europe. If, however, the water were available, there is no doubt that it would be used with freedom.

(3) The liquid waste from factories depends for quality on the nature of the business. Works which discharge much "chemical" refuse are not found with such frequency as in European towns. Sometimes even there are none at all.

(4) Storm water forms the subject of an engineering problem that has not yet arrived at its solution. This is not the place for a discussion in detail on the relative merits of the "combined" and "separate" systems, and the same arguments that hold good in temperate zones hold good also in the Tropics. In places where the annual rainfall is heavy and is compressed into a few months of the year, during which time it falls in heavy showers, giving 1·5—5 inches in twenty-four hours, and a total of 40—100 inches in the year, it is obviously out of the question to imagine a town with sewers capable of carrying off this quantity of water and at the same working satisfactorily in times of drought. Not only ordinary rainfall, but also not infrequent cyclonic storms have to be allowed for, which may give 10 or more inches in twenty-four hours, and keep up this rate for three days or so. Similarly showers, when they fall in the dry season, are generally heavy and beyond the capacity of most sewers. The amount of storm water that gets into the sewers depends on the character of the house connections; the courtyard and roof washings may find their way into common drain or not. In a place with a rainfall of 40 inches and more, falling in a short period, it would never be advisable to allow storm water to pass into the sewers; and even in places which only have a fall of 30 inches, if this mostly comes down within a few weeks, sewers will be unable to carry off the excess. The filthy character of the first washings at the beginning of the rainy season, and also during

* For a mixed population I find that 8 oz. per head per day is by no means too high a figure on which to base a calculation.

the occasional thunder showers of the dry season, would justify an attempt to carry this much of the storm water away through the sewers if it could possibly be managed by any contrivance.

(5) Silt or sludge is the mixture of mud, sand and organic detritus which settles in the catchpits and sewer pipes. Its composition varies with the nature of the house and street connections, and with the character of the soil and habits of the people. If road washings can get into the sewers after rain the pipes will rapidly become partially filled with a deposit of mud and sand. If courtyard washings can get in at ordinary times there will be every day a large quantity of mud and dust added to the sewage, which soon settles to the bottom, unless the gradients be particularly steep. The natives generally look upon a drain, if there is such a thing, as a convenient place into which to fling any waste matter, solid or liquid. Ashes, sticks, stones, straw, and a vast amount of vegetable *débris* are thus added to the sewage. These being mixed up with the road detritus, a black, slimy, and sometimes evil-smelling compound is formed, which in sewers with only a gentle gradient necessitates periodical cleansing of the whole length at intervals of three months or so, if a total block is to be avoided. Gratings, traps and catchpits at the inlets are not sufficient to arrest all this suspended matter, and moreover require almost hourly attention, otherwise they will themselves become blocked and cause backing up and possibly an overflow into the street. When removed from sewers and catchpits this black silt contains a large proportion of water, which drains away from it comparatively slowly. If put at once into carts for removal, power is wasted in carrying away sewage which might have flowed through the sewer; if allowed to drain and dry *in situ*, a nuisance, if nothing more, is caused.

(6) As just stated, a good deal of solid refuse, which should really be classed as "dry rubbish," and removed by ordinary rubbish carts, finds its way into the drains. As for the rest, if there be any open land or garden attached to the house, some natives will throw it there; others who object to any refuse being on their own premises, but do not mind untidy streets, simply cast it out of their doors. It is difficult enough to get them to carry it to public dustbins, and they will not keep private dustbins for themselves at all on their premises. The character of the refuse is quite different from that found in England. The frugal native throws nothing away to which any value whatever can be attached. Hence there is nothing combustible in the shape of coal or wood. Anything eatable is taken out of it at once by low-class passers-by, and what they miss is secured by crows, kites and dogs. Stray cattle chew up any edible green stuff. The remainder, when removed by municipal carts, consists of mud, dust, ashes, cocoanut shells, vegetable stalks and refuse, leaves, a little straw, a few rags and bits of paper, much broken pottery, a few tins, and often a considerable admixture of fæcal matter. So far from burning readily and being a source of energy and profit, this rubbish, though it readily decomposes and stinks abominably, can scarcely be persuaded to burn without added fuel.

Having now given a brief sketch of the source and composition of the substances which have to be dealt with in a system of drainage and sewerage, and having instanced a few of the difficulties to be contended with, I will proceed to the consideration of various systems now in force in different localities, and after outlining their merits and demerits, I shall be in a position to show what modifications or radical changes are required.

Systems in vogue for dealing with (1) Excreta—(*a*) private, (*b*) public, (*c*) liquid excreta.

(2) Sewage.

(3) Storm water.

(4) Silt.

(5) Rubbish.

The act of defæcation being attended with the elaborate ceremonial of religious observance in the case of certain classes, it is useless to expect them to depart from the custom of ages in order to conform to modern usage, except in large towns where circumstances often render it impossible for them to follow their rules of life with scrupulous exactitude. Public opinion and police interference alone are able to stop reckless defæcation in inhabited areas. In some parts houses have *middle pits* inside or closely adjoining them. The occupiers squat over a hole in the ground, and the evacuations may or may not be covered with ashes. Sometimes if this pit be outside the house it serves to contain both excreta and the other refuse of the household. When full the contents are either removed, or else a new pit is excavated by its side and earth piled on the top of the old one. The offence given by this arrangement depends on the quantity of liquid, urine and house washings, which finds its way into the pit. When kept dry, especially if ashes be used to cover the day's deposit, it is astonishing how little smell there is. But if the house washings are allowed to flow into the pit also, prutefaction takes place instead of nitrification, and the wonder then is that the occupiers can tolerate the pestilential atmosphere of their abode for a moment. If the pit is inside the house and quite dark it is not visited by flies; but if it is outside, where the light can reach it, and vegetable refuse is added, and the mass left uncovered by earth and ashes, swarms of diptera breed in it.

The soakage from such pits is bound to pollute all surface wells near, and it sometimes renders them so brackish that the use of the water is abandoned. Such a system has, of course, nothing to recommend it.

In other places the houses have some form of privy attached to them, from which excreta are removed by hand at intervals. At the same time urine and house washings are directed into huge underground "*sink pits*," either beneath the house or beneath the roadway. This method, too, is most objectionable.

(*a*) *Forms of House Latrines.*—Few of the many dozens of patterns of privy which have been suggested as suitable for native houses work satisfactorily from the sanitary point of view. The fact is, that be a latrine, private or public, never so cunningly conceived, and adapted to the various prejudices of those who are to use it, nothing can guard against carelessness and deliberate misuse on the part of those who frequent it; and hence the simplest structure, if properly used, even though it possesses several obvious dis-

advantages, is often more successful sanitarily than a more complicated and, at first sight, less objectionable type. The system, which is practicable only amongst the comparatively well-to-do, of using commodes within the house, the contents of which are almost immediately removed by a scavenger kept about the premises, and are either kept in a bucket for removal by the public conservancy cart or buried in shallow trenches, if there be space enough attached to the dwelling, can have no serious objection lodged against it, beyond the fact that it is a troublesome one.

Any form of privy which necessitates the use of movable pans or receptacles of any sort, unless the dry earth system be strictly adhered to, has the disadvantage of requiring a place where the house scavenger can wash the receptable clean. In a large garden where a trench and a supply of water can be set apart for this purpose no difficulty arises; but if there be no gardens, the operation must be so conducted in a corner of the privy that the washings find their way into either the street drain or a catchpit provided for the purpose, which requires a special service of carts to empty it, and even then is a source of nuisance. The ordinary form of water closet has not been found to solve the difficulty in places where it has been introduced, partly on account of its unsuitability to the habits of the natives, partly because the trap and pipe are always becoming blocked by the foreign bodies which people, who never reserve a thing for its proper use, fling into the receiver.

(*b*) Public latrines are in designs most various. Many are simply mud or masonry walled enclosures, with either a hard earth or sandy floor, any part of which is used for defæcation. When under a hot sun less nuisance arises from such places than might be imagined, especially if all the soil be carefully scraped up twice a day; but in damp or rainy weather they must be distinctly malodorous. Further, the excreta are exposed to flies; and pigs, buffaloes and fowls find their way in, or even sometimes are driven in on purpose to scavenge. Masonry latrines with cemented floors and seats are not unfrequent in populous parts. The excreta are passed on the flooring, and urine dribbles away to a catchpit. Such an arrangement is generally a terrible nuisance to the neighbourhood, as it can never be properly cleaned. Even if pans are used to collect the excreta, difficulties usually arise as to washing them, and this, of course, applies equally to other more complicated patterns, in which each seat is provided with a special bucket. If plenty of water be available, together with a sewer to carry it away, the receptacles can be thoroughly cleaned on the spot; but with both water and sewer available, some form of water carriage latrine is generally more satisfactory. The only other remedy is to remove both buckets and contents together, replace them by clean ones, and wash them out somewhere else before bringing them back; but practical difficulties often prevent any such arrangement.

The collection of excreta in public carts from both private and public latrines can hardly be conducted without grave nuisance, unless the dry earth system is prevalent; but this has been found unworkable on a large scale. By causing the carts to circulate at night the annoyance may be minimised; but this again often is not possible in thickly inhabited areas, for numerous reasons connected with the habits of the people and the class of labour available.

It is impossible for a cart to go round the streets by day or night, and for the driver to empty into it the contents of numerous private receptacles without causing foul smells, added to which are the dangers resulting from the matter being spilled in the roadway. It is equally impossible for the driver to clean each private receptacle before replacing it, and I do not think that any native city could, with the funds available, be so controlled that a well-managed bucket system could be carried on. Frequently, too, no means exist for washing or otherwise cleaning the carts themselves at the end of each trip, so that they furnish a *bouquet* on their return journey, and poison the depôt in which they are kept.

The final disposal of the collected excreta is usually by some form of *burial* or *trenching*. When enough suitable land is available within a reasonable distance of the town, trenching may doubtless be pursued with both satisfaction and profit; but in practice some one of the factors necessary for complete success is generally wanting, and the larger the town and the more night soil there is to be got rid of, the greater the difficulties are. If the land is not extensive enough it has to be used over again before the previous deposit has been thoroughly disintegrated; if the soil is of clay disintegration is delayed, and if low-lying it is unfit for use in rainy weather.

The ideal trenching ground is one which is large enough to admit of trenches not more than one foot deep at the outside being dug. Into these not more than nine inches depth of night soil should be poured. In a porous soil the more liquid portion is rapidly absorbed, and the one foot of earth which is placed on the top soon subsides. For subsequent cropping it is generally necessary to irrigate the ground, at any rate in the dry season. I have known trenching grounds on which nothing could be grown for want of water during the dry season, and which were a swamp during the rains.

The area of land required for trenching, allowing only nine inches of soil in one foot deep trenches is one acre for 4,000 persons. This would be filled up in 315 days. But if the conditions were favourable, it would be quite possible to begin again at the end of that time, cutting the trenches at right angles to the first row. If the land is to be successfully cropped, however, the above area must be somewhat extended.

Burial in deep pits is a method which can under no circumstances be recommended. If such a pit be turned up several years after, the night soil is often found to be still not disintegrated and in the form of a black slime, and most offensive.

Burning night soil mixed with rubbish or fuel is successfully accomplished on a small scale in some places in incinerators. The practice has little to recommend it, except as regards infectious diseases hospitals, and indeed, would scarcely be feasible on a large scale without undue expenditure in the way of fuel.

Sewer disposal is undoubedly the cheapest, safest, and least offensive method of removing excreta from inhabited areas. Even though there be no house connections, the soil, after collection in carts, can be introduced into the sewers at stations conveniently distributed, and the carts at the same time can be thoroughly washed out and cleaned before being allowed to return to their depôt.

When sewers exist suitable and sanitary public latrines can easily be maintained. Probably the best type for native use is one on the trough system, the contents of which are automatically flushed out into the sewers at stated intervals.

Isolated latrines which can have no sewer connection can be satisfactorily worked on the septic tank principle, but the initial expense of such a structure is of course great.

(*c*) *Liquid Excreta.*—When there are no drains, urine from houses is generally collected with the waste water in open or closed cemented catchpits outside the house, or else passed into an immense pervious sinkpit, which is either beneath the house or beneath the roadway. Such a pit rarely gives the householder trouble in the way of requiring to be emptied; but of course in a town in which they are plentiful, if at the same time its inhabitants derive their water supply from private wells, the water is polluted, and in time sometimes even becomes too brackish to drink, and intestinal diseases are naturally rife. Covered catchpits can never be satisfactorily emptied for want of sufficient carts, and they are always offensive.

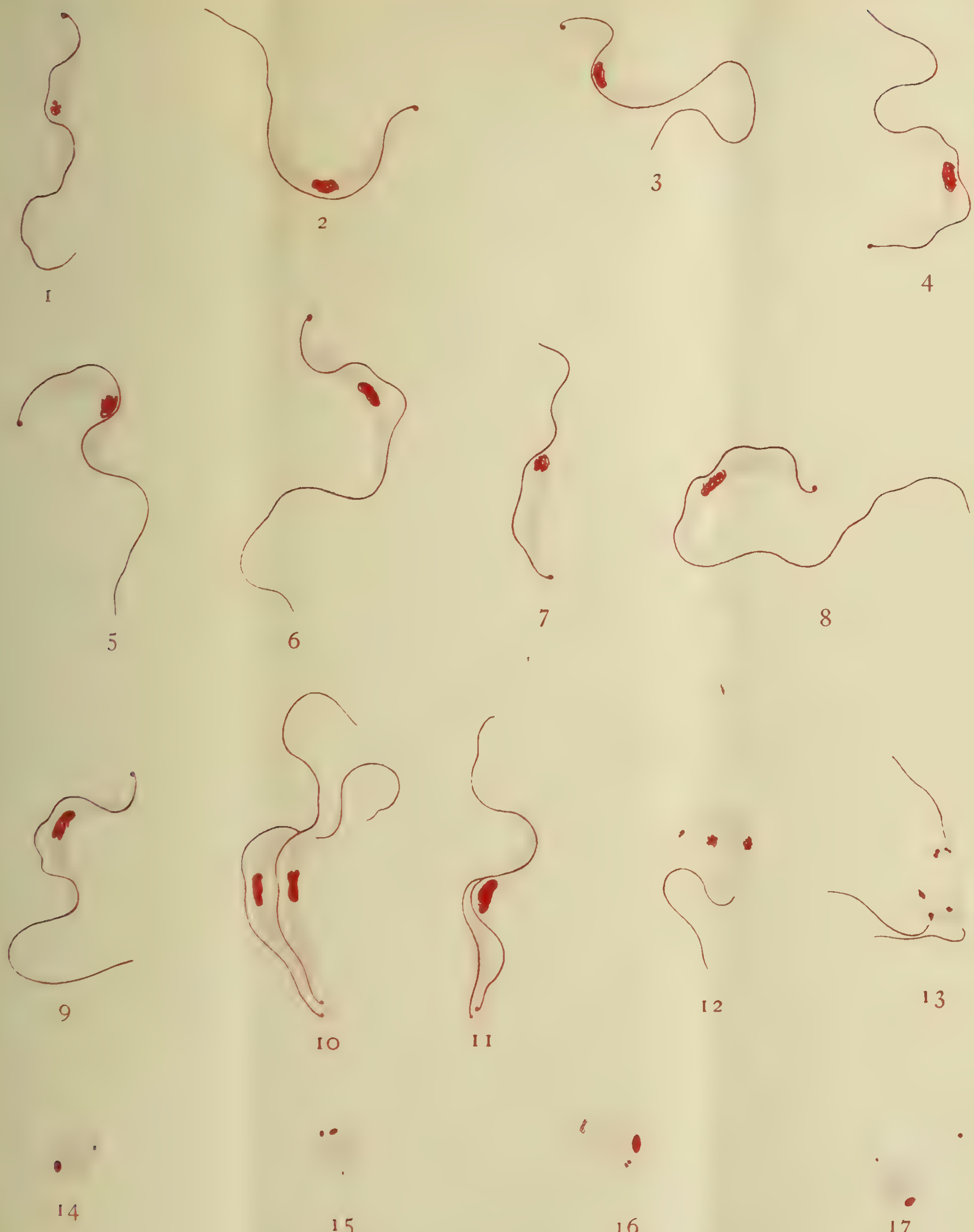
Public urinals are occasionally managed without drains, by collecting the urine in various forms of receptacles and carting it away; but I have not seen one that was satisfactory, and doubt if it would be possible to maintain one in a sanitary condition without drains, unless an extremely expensive filtering apparatus were attached. Public urinals are too frequently used for defæcation by careless people. If drains are available, together with water for flushing, these difficulties vanish.

(2) *The collection of sewage* is performed in various ways: The open or closed impervious catchpit already commented on above; the pervious underground sinkpit; the roadside channel excavated out of the mud with no lining, known as a ditch drain; the open brick drain; the open V-shaped drain made of stone slabs, and the U-shaped, cemented, open drain, known as a side drain. The sewage may be conveyed all the way to its outfall by these drains, if it is not evaporated or soaked up by the soil on the way, or discharged after a while into large underground collecting sewers. I may say at once that however built, with good gradients or bad, of impervious materials or not, the *open side drain* has nothing to recommend it. It has been greatly praised in the past, chiefly, I fancy, by engineers who had never had anything to do with the practical management of it. The arguments adduced in favour of open side drains are: (1) They are open to the view, and all obstructions can be at once seen and removed; (2) there can be no collection of foul gases, anything evolved is at once freely diluted and rendered unnoticeable; (3) they cost less to build and to maintain; (4) no traps, ventilators and other adjuncts are required; (5) rats are not harboured.

Their disadvantages are, however, overwhelming. Though they cost less to put down, they occupy valuable space on each side of the roadway, they interfere with traffic, they are always getting broken by the wheels of vehicles, road detritus blows into them, everybody flings solid rubbish into them, they get obstructed every fifty yards or so, and hordes of coolies have to be maintained to remove the obstructions. It is rarely possible to obtain proper gradients for them, nor can coolies be kept at work all day and every day removing vegetable obstructions and cleaning out the mud which collects. Counting labour, the cost of maintenance probably counterbalances the cheapness. It is impossible even with the aid of flushing with water and daily mechanical cleaning to prevent the formation of a black offensive slime on the sides of the channels, and when the air is calm a sickly smell arises from them, which is the cause of many complaints. Added to this they contain a certain proportion of fæcal matter from the washing of house latrines, and in side streets both adults and children defæcate into them; the children play and paddle in them, the fowls flop into them, and these return and contaminate their houses. If the side drains are eventually connected with underground sewers, even though silt traps be interposed, enormous quantities of road detritus get carried into the sewers, necessitating constant mechanical cleansing. Finally, they are bound to carry rain water, and after heavy rain each side drain is filled to the brim with mud, instead of being washed clean, as might at first be thought probable, and it may take days for the ordinary staff to clear them again.

Closed sewers, on the other hand, though not entirely free from objection, have many advantages; but to be at their best they must be connected directly with the houses, so that all house drainage passes directly into them, and no opportunity is given to detritus to find an entrance, except the comparatively small quantity which is washed in during the daily sluicing of the house courtyard, and the dust from the house roofs which is brought down by rain. The admission of night soil into the sewers, whether from house or public latrines, makes no sort of difference. The existence of sewers at once renders it possible to maintain markets, slaughter houses, and such places in a state of cleanliness which otherwise cannot be arrived at. When road detritus and street rubbish is thus kept out, well-laid sewers require comparatively little attention and a large cleaning staff can be dispensed with, though two gangs are always wanted, one to attend to house connections and the other to manholes and the sewers themselves.

Whether open drains or closed sewers exist makes little difference in the problem of the final disposal of the sewage. Probably in few places can the practice of discharging it untreated into the sea or watercourse be defended. In the Tropics waste land is generally available somewhere near towns, and owing to the rate of evaporation and the frequent impossibility of carrying on any sort of cultivation without free irrigation, the obvious method is to irrigate land with the sewage and grow crops. Only in places where the rainfall is very



TRYPANOSOMA Castellanii (Kruse).

1-9, Adult forms; 10, 11, Division forms; 12, 13, Various developmental forms; 14-17, Amœboid forms.

(See article by Dr. ALDO CASTELLANI, published in the JOURNAL OF TROPICAL MEDICINE, June 1, 1903.)

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heavy, from 80 to 150 inches in the year, will irrigation be impossible all the year round. These are the very places where it is easiest to allow the sewage to run into a watercourse, and where least harm is likely to result from doing so. Places which have a heavy rainfall are generally situated on or near the coast, and are backed by a range of hills, from which torrents rush down, and there is no likelihood of poisoning any water by turning sewage into such a torrent a short distance from its mouth.

There is no object in treating sewage by chemical methods before utilising it, nor as a rule is there any particular advantage in subjecting it to the action of bacterial filters. Experience has shown that the land is perfectly well able to deal with crude sewage for ten years in succession without getting its pores blocked by deposit or any other *contretemps* occurring, provided that the supervision is intelligent. The area available must be sufficiently large to allow each plot sufficient rest to prevent water logging, but the question of under drainage depends entirely on the character of the soil. Grasses of various species grow admirably on a farm irrigated with sewage; also vegetables, rice and sugar cane. Plantains and fruit trees inserted as intervals do well, too.

(3) *Storm Water*.—If open side drains exist they collect most of the storm water and carry it away to the sewage outfall, where arrangements have to be made for getting rid of this sudden accession of liquid. If closed sewers exist, the best way is to collect the storm water in open ditches by the sides of little frequented roads, and to convey it to a convenient outfall as quickly as may be.

(4) *Silt* is the name given to the mud removed from side drains, intercepting traps, manholes, and sewers. It is best prevented from coming into existence altogether by having no drains to which mud can obtain access. It is a dangerous and offensive substance, which can only be disposed of by dumping far away from habitations, where it may be useful in covering rubbish. It should never be used for filling up wells or tanks near houses, or where there is a chance of polluting the ground water. As it becomes odourless when dry, there is sometimes a tendency to treat it as if it were clean earth, but from its origin it is clear that it may contain many virulent organisms.

(5) Practically there are only two ways of *disposing of rubbish*—by dumping or by burning. Where suitable land is available reclamation may well be carried on with the rubbish; but any deposit near inhabited areas cannot be permitted, not only on account of the smell, but because of the fouling of the subsoil and ground water. Rubbish must never be used for filling wells and tanks and low ground in towns. If relieved of tins and broken pottery it improves the character of the soil when dug into cultivated land, but the difficulty usually is to get it to the places where it is wanted. Similar difficulties of transport become very acute in large towns, and hence incineration is not unfrequently the cheapest way out, in spite of the fact that no energy may be obtained in the process. Sometimes a railway or tram line may be utilised for running trucks of rubbish to a distance from the town. No law can be laid down as to the best way of disposal unless local conditions are known.

THE BEST SYSTEM OF DRAINAGE.

Having now stated my data, it remains only to indicate the system of drainage that seems best suited in general respects for tropical climates. Seldom will it be found practicable to establish water closets in native houses, and, unless their customs and general intelligence will permit them to utilise and understand them, it is not even desirable to make the attempt. But as regards the removal of liquid waste, there can be no question that underground sewers are by far the most sanitary, and in the long run, I believe, the cheapest means.

Even more careful supervision is required during the construction of sewers when native labour is employed than in England. There is no blunder too egregious for them to commit. They will miss out pipes here and there, or even fill up a trenceh without having laid a pipe for 30 yards; they will omit the jointing, or heave in a bucket of cement, which afterwards necessitates the sewer being broken open.

The drain from each house should pass through the house wall, and should be connected outside with an intercepting trap, which leads by a 3-inch or 4-inch drain to the street sewer. The house drain should not join the trap directly, but be disconnected at its mouth. The object of the trap is not so much to prevent the escape of sewer gases backwards as to keep foreign bodies out of the 4-inch connecting drain. If the house drain were to be disconnected from the connecting 4-inch drain and the trap omitted there would be little chance of sewer gas finding its way into the interior of the house; but the opening, which must be of some size, would allow all kinds of solid bodies to be purposely or accidentally thrust into the 4-inch drain, and the latter would continually be blocked and would have to be dug up and broken. If the opening can be hidden away in an inaccessible place the trap may be dispensed with; if it cannot, then the trap is necessary, for when it by chance gets blocked up it is easier to remove the obstruction from it than from a deeply-laid drain. The flow of water from house drains is never very sudden, and the breaking of the water seal in the trap by syphonage is hardly likely to occur, so a ventilating tube on the sewer side is scarcely necessary. Even supposing the water seal were temporarily broken, sewer gas would find its way out to the open air through the disconnection much more readily than it would penetrate a hole in the wall to find a way into the house.

The form that drains inside houses should take is undoubtedly an open cemented channel, every part of which is open to view. The length of channel inside the house should be as small as possible, and the latrine should be situated close to the point of exit of the house drain, so as to avoid the necessity of having to run a long drain carrying latrine washing under the flooring of two or three rooms. If the latrine is at the back of the house, the connecting drain may sometimes be carried to the front outside the house wall. Nothing

is required to keep such a drain perfectly sweet beyond a daily wash with clean water and a broom.

Each house, therefore, would discharge its latrine washings and waste water generally into the street sewer through a 4-inch drain, disconnected with the house drain, and with an intercepting trap inserted just outside the house, if circumstances render it necessary. If traps are not used, owing to the multitude of direct openings into the sewer, there is no collection of sewer gas, and no nuisance is likely to arise from smells emanating from these openings; and last, but not least, health is in no way injured. In the case of houses with more than one storey, if there be waste water to be disposed of from the upper floor, it can be received into a discharge pipe fixed outside the house wall and joining the ground floor drain at the point of its exit from the house wall.

Great difficulties as regards house latrines arise in the case of high houses inhabited by numerous families, perhaps of different castes. Privies on upper floors must never be encouraged, but sometimes they cannot be dispensed with. They must never be connected with a chamber on the ground floor by a long tube down which the fæces are supposed to fall, and which can never be cleaned. Water closets are generally out of the question, and that being so, it is best for the privy or privies on each floor to be complete in themselves, and for the scavenger to ascend by a special staircase to clean each one in turn and bring down the soil. The washings only may be conducted away by the discharge pipe alluded to above, fixed to the outer walls of the house.

The actual form of these privies is immaterial. They must be on the dry system, and as it is impossible to get dry earth or ashes generally used in a large town, all we can hope for is an impermeable floor which can be washed quite clean, a pipe to carry the washings and urine away at once to the sewer, and a receptacle for receiving the excreta which can be moved and thoroughly cleaned.

The street sewers should have manholes at frequent intervals to facilitate mechanical cleaning, and each manhole should be connected with the open air by a 4-inch or 6-inch ventilating pipe run up a tree or attached to a house wall, with its summit well above the tiles. In putting up ventilating pipes, care must be taken to see that they are always carried straight from the point to be ventilated to the open air, otherwise ignorant workpeople will introduce five or six curves or right angles, if these happen to render the attachment of the pipe easier. Flushing cisterns at the head of a line of sewers are rarely of any real use in cleaning out deposits.

In flat towns sewage must be raised at intervals before the outfall is reached, and Shone's compressed air system, or some modification of it, fulfils all requirements. Night soil collected in public carts must be let into the sewers at conveniently situated stations. Gravity may be sufficient, if not, compressed air must be used. The only thing that requires care is so to arrange the station that it is not an intolerable nuisance to its immediate neighbourhood, and this can be attained by having a chamber with two tightly-fitting doors and no open windows. The cart or carts enter by one door, every aperture is then closed, the cart is emptied, is washed clean, and finally sent out by the other door. During the process a fire should be kept burning in a high chimney which creates a strong draught and sucks out all the odours from the chamber, inlet valves being so arranged round the chamber that the outer air sucked in is equally distributed. The foul air passing over the fire is to some extent deodorised; but it any case it must be discharged at a considerable height into the outer air.

The mixed sewage and excreta are received upon a broad irrigation farm, and are there rendered innocuous, whilst enriching the ground.

Public latrines are best arranged on the trough system and flushed out at due intervals by an automatic tipper. This pattern, though it has some objections, is on the whole by far the simplest, cheapest, and least troublesome. Public urinals and all other buildings can be similarly connected with the sewers through intercepting traps.

Storm water should not be admitted to the sewers, but separately provided for by open ditches.

Review.

STUDIES FROM THE INSTITUTE FOR MEDICAL RESEARCH, FEDERATED MALAY STATES. An Inquiry into the Etiology and Pathology of Beri-beri. By Hamilton Wright, M.D., Director of the Institute. Vol. ii., No. 1. Singapore: Kelly and Walsh, 1902.

Although Dr. Wright has not succeeded in placing the pathology of beri-beri on an incontrovertible basis, he has, at the expenditure of much labour, close observation, and a wide sphere of study, greatly advanced our store of knowledge concerning the disease. No element having any possible bearing on the disease has been omitted. He has studied the geography, geology, and meteorology of the district in which he made his observations, and dealt with the hygiene, food, and racial tendencies of the several peoples amongst whom he worked. The pathological anatomy of beri-beri has never been so carefully studied hitherto, and the observations on the condition of the nervous system generally have been studied with the precision of an expert neurologist.

The lesions to which Wright draws particular attention are "congestion or inflammation and hæmorrhagic injection of the pyloric end of the stomach and the duodenum; chromatolysis and eccentricity of the nuclei of cells in the spinal cord and bulb, with more or less complete parenchymatous degeneration in the distal portions of both afferent and efferent fibres to which they act as trophic centres."

Wright believes that beri-beri is caused by a specific organism which enters by the mouth, probably with the food, and in the pyloric end of the stomach and in the duodenum develops a toxine which induces peripheral paretic lesions.

Many careful observations and valuable statistics will be found in this report, which has been drawn up in a thoroughly scientific fashion.

Notes and News.

Plague Hospital in Hong Kong.—On June 6th, the Governor of Hong Kong opened a new building styled the Tung-Wa Plague Hospital. The Tung-Wa General Hospital in Hong Kong is a native hospital built and maintained by the Chinese community. Until quite recently the treatment was entrusted to native doctors; but during the past few years European treatment has been allowed and practised under the direction of Dr. J. C. Thomson, assisted by several Chinese graduates of the College of Medicine for Chinese, Hong Kong. The success which has attended the General Hospital under the new *régimé* has further encouraged the Chinese in the direction of extending European treatment in sickness, hence the establishment of the Plague Hospital under European control. According to the report in the lay press the new hospital is built in the Renaissance style of architecture, erected in red brick, and presents a very imposing appearance. There are six wards capable of holding twenty patients each, a convalescent ward, administrative blocks with residences for doctors and nurses, mortuary, &c. The hospital is in every way modern in its equipment and will prove a valuable addition to the sanitary equipment of the colony.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Beri-beri.

Beri-beri, by F. Destéfano. *Semana Medica*, Year x., No. 18.—Destéfano repudiates the idea that beri-beri is an infectious disease, basing his argument upon the fact that improved diet brings about a cure without medicinal treatment. He argues that no infectious disease can be cured by a change of diet merely. In the blood of beri-beri patients he found neither a germ nor a parasite, and believes the disease to be caused by an intoxication, having its seat in the alimentary canal. Amongst characteristic symptoms he mentions pain in the epigastrium and a "beri-beri girdle" of constriction round the lower part of the thorax, to which the dyspnœa in beri-beri is mainly due.

Dysentery.

Malarial Dysentery, by W. B. Burns, M.D. *Journ. Amer. Med. Assoc.*, July 15th, 1903.—The *post-mortem* features of malarial dysentery:—

Stomach.—In 21 of the cases the condition of the stomach is not stated; it was normal in 5 and congested in 1. In 13 cases a morbid condition was specified thus: In 4 the organ contained a green-grumous or mud-like liquid; in 3 its mucous membrane was congested; in 1 softened; in 1 slate-coloured; in 1 thickened, and in 4 ecchymosed.

Intestinal Canal.—In 6 of the 40 cases the intestines were reported healthy; in 9 their condition was not stated. In 13 of the remaining 25 cases the large and small intestines, so far as can be ascertained from the phraseology of the reports, were both affected. Five of the cases were much congested or inflamed, but not ulcerated; in the first-mentioned, for instance, the canal was almost black from the engorged condition of the capillaries, and coagulated blood was found in its interior. In 1 of the 13 cases the mucous membrane was softened, and in 7 ulcerated; in 2 of the latter the duodenum alone was ulcerated, although the canal was generally highly congested; in 1 the ulcerations were reported as slight; in 1 as old; in 1 as large, and in 1 as small, and in 1 as associated with a congested condition of the mucous membrane. In 6 of the 25 cases the condition of the small and large intestines is specifically stated. In 1 both were inflamed, but the patches of Peyer were not diseased; in 1 both were much congested and ecchymosed; in 2 deposits of black pigment were found in the large intestine, while the ileum in 1 was but slightly congested, and in the other merely stained with bile. On the other hand, the patches of Peyer in 1 presented the pigmented appearance, while the rectum was ulcerated; in 1 the mucous membrane of the ileum was softened and thickened, that of the colon congested. In the remaining 6 of the 25 cases the small intestine or ileum only was affected. In 3 it was congested, in 1 of which the patches of Peyer and the solitary glands were enlarged; in 1 it was ulcerated; in 1 congested to a purple colour, which presented a deeper tint in the apices of the solitary glands, although the patches of Peyer were unaffected; in 1 also there was a deeply coloured congestion which was especially marked throughout the jejunum.

Craig, in his book on Æstivo-Autumnal Malaria, leans very pronouncedly to the plasmodium as a causative factor in diarrhœa and dysentery.

I have seen many, many times cases of dysentery respond promptly to quinine treatment. I am not now possessed of the case notes in these cases, but I remember well to have had a small epidemic of dysentery, each case of which began with the algid form of pernicious malaria. These were not merely of the catarrhal character, but there was "chopped meat" discharges, evidence of some sloughing. All of these cases—about 12 in number—responded to ordinary antiseptic irrigations, gland arousement and quinine in a week or less. Convalescence rapid.

Lastly, malarial parasites have been found not infrequently in the vessels of the mucosa and submucosa in cases of malarial dysentery coming to necropsy.

Intestinal Catarrh.

Treatment of Chronic Catarrh of the Large Intestine by Irrigations, by L. von Aldor. *Berliner Klinische Wochenschrift*, May 11th, 1903. Aldor recommends for chronic intestinal catarrh, after the bowel is washed out by an ordinary cleansing enema, that two or three quarts of water at a temperature of about 80° F., with Carlsbad Sprudel salts added, be thrown up the bowel and retained as long as possible. The irrigations may be continued once daily for twenty to twenty-five days.

Leprosy.

Mr. Jonathan Hutchinson, in the *Polyclinic* for July, 1903, discusses Dr. E. F. Neve's contention that fish could not be the cause of leprosy, as shepherds and farm labourers far from fishing grounds suffered more than the boatmen engaged in catching fish. Mr. Hutchinson declares that it is in parts remote from the sea, and from lakes and streams where fish are caught, where unsound fish are consumed; fresh fish is consumed by the fisher folk themselves for the most part, but inland dwellers have to depend on fish which is all too frequently badly cured, and Mr. Hutchinson wishes it to be clearly understood that it is badly cured fish that he accuses as the cause of leprosy. He applies the same reasoning to refute Mr. Vincent Richard's statement in the *Indian Medical Gazette* for September, 1899, concerning the practical measures for the prevention of leprosy in India. Mr. Hutchinson recommends that the native population should be informed as to the best methods of curing fish; he condemns the salt tax, and suggests that the authorities of the Roman Catholic Church should be moved to forbid the use of fish on fast days in leprous countries.

Malaria.

Malaria as seen in the Andaman Penal Settlement, by E. E. Waters. *Lancet*, June 13th, 1903.—During 1902 Dr. Waters states that there were 14,000 cases of malaria and 57 deaths from the disease in the Andaman Island Penal Settlement in the Indian Ocean. Many of the cases were due to relapses, largely due to insanitary conditions, including insufficient food and exposure. The *Anopheles Rossii* is the only variety of Anopheles met with in the Andamans. Enlarged spleens prevailed amongst the children. Waters found that the percentage of large uninuclear cells often fell below 15 per cent., thus differing from the conclusions of Rogers.

Spleen.

Splenopexy for Movable Malarial Hypertrophic Spleen, by Carlo Mariani. *Gazzeta Degli Ospedali e Delle Cliniche*, May 3rd, 1903.—In a case of movable spleen, hypertrophied as the result of chronic malaria, and giving rise to pain, constipation and gastric disturbances, Mariani made an incision over the spleen and stitched the organ to the margins of the abdominal wound. The patient developed an empyema after the operation, but made a good recovery.

Yellow Fever.

In the Mexican districts of Tampico, Progreso and Merida, yellow fever prevails in an epidemic form.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bactcriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

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5. Correspondents should look for replies under the head "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—AUGUST 15TH, 1903.

Original Communications.

MOSQUITOES AND STEAMERS.

By ANDREW BALFOUR, M.D., B.Sc., M.R.C.P.Edin., D.P.H.Camb.

Director of Gordon College Laboratories, Khartoum.

LAST autumn, as a student at the London School of Tropical Medicine, I had the privilege of hearing Sir Patrick Manson foreshadow the possible danger of an invasion of Asia by yellow fever as the result of the opening of the Panama Canal. In the JOURNAL OF TROPICAL MEDICINE, June 1st, 1903, I notice a most interesting and suggestive article on this subject by Dr. St. George Gray, in which he outlines the measures to be taken for the destruction of the mosquito concerned, the *Stegomyia fasciata*. Neither he, nor, as far as I am aware, any other writer, has, however, pointed out that steamers may themselves serve as breeding places for Stegomyia. This important fact has recently been forcibly brought home to me in the course of mosquito work at Khartoum. In my search for different genera and species I was led to inspect the steamers which ply up and down the Blue and White Niles, and which I heard were perfect hot-beds for these insects. The reason was soon apparent. In most instances I found the bilge water swarming with larvæ, which in some cases were even present in the oily water standing in the engine rooms and not infrequently in the water of the closet cisterns. As might have been expected from its well-known travelling capacities, the genus *Stegomyia* was chiefly implicated. I found two species of this genus with their respective larvæ, and they constituted themselves veritable pests on board. A species of *Culex* has also been discovered, but it is possible that it may only breed on board while the boats are lying up at Khartoum, or at Halfaya on the opposite bank of the Blue Nile. This is the more likely as the Culex found is that which is very common in this neighbourhood, while I have not encountered either of the two species of *Stegomyia* ashore. A third species of this genus I have come across in several houses, but not afloat. I found no larvæ of Anopheles on the steamers, but Anopheles, I am told, is a frequent passenger. In all probability it will not breed on board, the water being too filthy for its fastidious taste. So far I have only met with this genus on land in the person of *Anopheles costalis*, or an allied species. Measures are being devised for ridding the steamers of these undesirable stowaways, but it would seem that something more than the fumigation mentioned by Dr. Gray may be necessary in the war to be waged with the carrier of yellow fever. Systematic inspection of the bilge water, the water in engine rooms, and indeed any stagnant water collection on board steamers is indicated; for are we as yet in a position to say whether or not the organism of yellow fever, be it bacterium, flaggellate, or sporozoite, can be transmitted by the female imago to her off-spring? Be that or not as it may, the destruction of the mosquito in any of its stages is a necessary measure: and it is well to remember that these insects are credited with the habit of returning, as adults, to the spot where they existed as eggs, larvæ and nymphs. Thus a ship-bred mosquito might very well pay a "flying visit" ashore, acquire the yellow fever germ from a patient but newly struck down, and return as potential death to her accustomed haunts. No doubt in the past many ship infections have been due to mosquitoes bred out in the bilge.

EOSINOPHILIA ASSOCIATED WITH DRACONTIASIS.

By LEONARD S. DUDGEON, M.R.C.P.Lond.

Superintendent of the Clinical Laboratory, &c., St. Thomas's Hospital, and

F. J. CHILD, M.A., M.B.Cantab.

Resident Medical Officer St. Thomas's Home.

THE patient, an English officer, was admitted to St. Thomas's Home in June, 1903, suffering from "guinea-worm" which was at that time in process of expulsion. He appears to have acquired the parasite while "big game shooting" in the Kurnool dis-

trict, Madras Presidency. During April, 1902, the water used for drinking purposes on the expedition was derived from the following sources: (1) Pools formed by jungle streams, which also served to supply cattle and wild animals; (2) wells; (3) a deep forest pit.

The water was generally boiled, but it was impossible to observe this precaution on every occasion. In the Kurnool district, several coolies were seen by the patient with guinea-worm protruding from their feet, wound up on a piece of stick. Such cases were always observed in localities where the water was obtained from sources (2) and (3) and not from (1).

Early in April, 1903, the patient was conscious of a slight dull pain on the inner side of the right foot, which he attributed to a sprained ankle resulting from a fall. The discomfort continued to increase, and on May 9th he noticed a small black spot on the inner side of the sole of the right foot. On May 22nd the worm first made its appearance, and during the journey from Bombay to England about nine inches escaped.

On admission to St. Thomas's Home, on June 18th, there was a small circular hole on the inner side of the right foot from which the worm protruded. The skin around was inflamed and tender as high as the internal malleolus, and beneath this area a tortuous line of thickening could be felt, evidently the track which the worm had made for its own habitation. If we squeezed this track a small quantity of white fluid escaped which was found to contain embryos. Hot dressings were applied and with rest in bed the inflammation had subsided by June 24th. The worm was injected on this date with a solution of 1 in 1,000 perchloride of mercury by means of an anti-toxin syringe, and the end of the worm was tied up to prevent the fluid escaping. For forty-eight hours the worm was extruded more rapidly than on previous occasions, but after this period it resumed its slow rate of progress, and by July 1st ten inches had been extruded. As a small quantity of pus escaped daily from the worm track, it appeared evident that even if the worm escaped entirely, the sinus would still require surgical treatment. It was therefore considered advisable to lay the track open along its course. This was done, and after cutting down on three separate points, the remainder of the worm was dislodged and was found to measure eleven inches. The entire length of the parasite was thirty inches. The wound healed rapidly and the patient left the "Home" a week after the removal of the worm.

Examination of the Blood.—Technique. The leucocytes were counted by the Strong-Seligmann method, which appears to be the most reliable in use at the present day. The films were stained with "Leishmann-Romanowsky."

Results. June 19.—Red cells = 5,331,250 per cmm.; hæmoglobin = 100 per cent.; colour index = 1; leucocytes = 4,430 per cmm. Fresh blood appeared to be normal. Differential count of 500 leucocytes as follows: Polymorphonuclear neutrophiles, 268 = 53·6 per cent.; small lymphocytes, 67 = 13·4 per cent.; large lymphocytes, 81 = 16·2 per cent.; eosinophiles, 67 = 13·4 per cent; large hyaline, 17 = 3·4 per cent. One mast cell seen while counting 500 leucocytes. A differential count of 500 leucocytes was also made from the blood obtained from the seat of the reaction, but the number of eosinophiles was almost identical with that obtained from other sources.

June 26.—Leucocytes = 5,800 per cmm. Polymorphonuclear neutrophiles, 318 = 63·6 per cent.; small lymphocytes, 92 = 18·4 per cent.; large lymphocytes, 14 = 2·8 per cent.; eosinophiles, 65 = 13 per cent.; large hyaline, 8 = 1·6 per cent. Three mast cells seen.

July 3.—Leucocytes, 4,800 per cmm. Polymorphonuclear neutrophiles 322 = 64·4 per cent.; small lymphocytes, 62 = 12·4 per cent.; large lymphocytes, 14 = 2·8 per cent.; eosinophiles, 92 = 18·4 per cent.; large hyaline, 10 = 2 per cent. Two mast cells seen.

July 8.—Leucocytes, 2,700 per cmm. Polymorphonuclear neutrophiles, 67 per cent.; small lymphocytes, 13·3 per cent.; large lymphocytes, 5·7 per cent.; eosinophiles, 13 per cent.; large hyaline, 1 per cent. One mast cell seen.

About two inches of the worm were cut up in normal saline so as to make a milky emulsion, and this was injected by one of us into a large black cat, but no eosinophilia was observed over such a short period as three weeks.

The chief interest in these blood examinations is due to the very marked eosinophilia. If we take 2 per cent. as the average number in normal blood with 6,000 leucocytes, we should obtain a total number of 120 leucocytes per cmm. In the recorded cases there is a certain amount of leucopænia, but the total number of eosinophiles would be about 520 per cmm., and if we were to allow for this leucopænia the result would be still more striking.

Eosinophilia associated with the various animal parasites is now so well known that it does not bear repetition, but the recognition of this important phenomenon is omitted from most of our standard works in medicine. There appears to be a considerable difference in the number of eosins which have been found in these various parasitic infections, *e.g.*, trichinosis is usually accompanied by a more marked percentage of eosins than occurs from the other parasites, while it is doubtful if any observer has noticed more than 6·8 per cent. in patients suffering from the effects of the *Oxyuris vermicularis*, so that it is possible that dracontiasis may occupy an intermediate position.

YELLOW FEVER AND MOSQUITOES.

A Critical Note by Dr. Ivo Bandi.
The Bacteriological Institute of the State of Sao Paulo, Brazil.

In addition to the many epidemiological observations which oppose the theory of the propagation of yellow fever through the agency of *Stegomyia fasciata*, there are some interesting accounts, relating to the feeding habits of this Culex, which also appear to contradict the newly advanced hypothesis.

Stegomyia fasciata is a diurnal mosquito, and this

fact has been confirmed by careful observations recently made in many localities.

Theobald, for instance, in his work "A Monograph of the Culicidæ in the World," writes as follows: "Regarding *Stegomyia fasciata*, Dr. St. George Gray says that *Stegomyia fasciata*, one of the most annoying and widespread mosquitoes, is a most vicious biter in the early afternoon, from about 1 to 3 p.m." And in addition to this: "Night is the time when both Culex and Anopheles cause most annoyance, from an hour or so before sunset to a short time after sunrise. But protection during those hours will not entirely save us from their annoyance, because certain species bite at other times, as for instance, the world-wide *Stegomyia fasciata* and the European *Culex dorsalis*."

Dr. Durham also, in his "Report of the Yellow Fever Expedition to Para," published in the Thompson Yates Laboratory Reports, vol. iv., part 2, May, 1902, expresses himself as follows in regard to this subject: "This species (*i.e.*, *Stegomyia fasciata*) in Para is solely a day-gnat; it consequently afforded means of observations. It is on the wing and will bite shortly after sunrise, about 6 a.m.: again a few have been observed biting about 8 to 9 a.m., after which there is a pause till about 11 a.m., when again a few may be feeding." The time of chief activity is in the middle of the day, from about 12 to 2 p.m. They then bite freely and are seen to copulate on the wing in numbers; another pause follows, though there may be a few about, but they do not cause trouble when one is sitting at the microscope from about 3.30 till about 5 p.m. After dusk I have only once met with a specimen; this was a male feeding from a sugar-basin, rather before 7 p.m.[1]

Ficalbi, in his work, "Venti specie di zanzare (Culicide) italiana, classate, descritte, &c.," makes the following observations in the chapter on the dietary of the *Culicidæ*: "As regards the fully-developed insect, I beg to reiterate that no mosquito, even though it swarm in the daytime, likes a bright light or rays of the sun; nevertheless, there are mosquitoes, such as the *Culex elegans* (*Stegomyia fasciata*) that are exclusively diurnal in their habits; the greater number of the species, however, are nocturnal or crepuscular."

In addition he remarks: "*Culex elegans* has many interesting dietetic characteristics. Being a diurnal mosquito, it is very worrying to any one sitting at a table studying or working at the microscope."

In the course of a lecture on the mosquito and malaria in connection with *Stegomyia fasciata*, Dr. Thompson makes the following observation: "And we have the appropriate Culex ready to carry it (yellow fever) from man to man, a mosquito which from its day-feeding habit is more difficult to reckon with than Anopheles."

Dr. Lutz terms the *Stegomyia fasciata* the "spotted day-mosquito," and Finlay also states that the Culex (*Stegomyia fasciata*) in Havana is a day-feeding mosquito.

The careful observations of great authorities on the subject undoubtedly justify us in regarding *Stegomyia fasciata*, if not as an entirely diurnal mosquito, at all events as an insect that principally bites during the daytime, be it in the tropical or temperate zone.

It is interesting in this connection to note that yellow fever is especially acquired during the night hours.

It is a well-known fact that the man who passes the night outside the infected belt of the inter-tropical zone enjoys complete immunity from the disease. Moreover, this immunity is also enjoyed by persons who pass the day in Rio de Janeiro, and return to Petropolis in the evening.

In order to establish the supposed etiological relation between *Stegomyia fasciata* and yellow fever, and taking into account that the visitors—business men chiefly—of Petropolis are in Rio de Janeiro from 10.30 a.m. to 3.30 p.m., it would be necessary to prove that Stegomyia is, at all events, a crepuscular mosquito.

This, however, is not the case, as we have shown, and as a matter of course this statement compromises the new etiological hypothesis. In a paper forwarded to the Director of Public Health for Brazil and which was read at the Fifth Medical Congress held in Rio de Janeiro, Drs. Simond and Marchoux sought to explain this phenomenon as follows: "The observations we have made lead us to infer that the *Stegomyia fasciata*, once infected, ceases to bite during the daytime, and bites at night only; there may possibly be exceptions, but as a rule this circumstance would explain the immunity of those persons who pass the night only outside the limits of the yellow fever boundary."

In criticising this hypothesis, we would first of all observe, that, we cannot imagine why the ingestion of blood should induce such a disturbance of the physiological functions of the Stegomyia as to cause it to entirely reverse one of its most important dietary characteristics. Moreover, this hypothesis is directly opposed to the above observations.

We cannot admit that all the examinations of mosquitoes could only have been upon those feeding on blood for the first time. In addition, I distinctly remember catching a number of Stegomyiæ in my laboratory at the yellow fever hospital of Sao Sebastiao in the middle of the day, and the microscopical examination of their digestive apparatus demonstrated the fact that they had previously sucked blood.

It is interesting to note that my laboratory in the Hospital of Sao Sebastiao was contiguous to the wards, therefore probably most of the Stegomyiæ caught by me had not only previously sucked blood, but were also "infected" according to the views expressed by Drs. Simond and Marchoux. The study of the *Stegomyia fasciata* in captivity teaches us that the views of Simond and Marchoux are merely theoretical.

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[1] It is remarkable that, though Durham admits that yellow fever is propagated by means of mosquitoes, he does not think it possible that *Stegomyia fasciata* is the intermediary host for the germs of the disease, as it is a diurnal mosquito, but is of opinion that it is *Culex fatigans* which bites after dusk. In this connection he makes an interesting statement: "*Culex fatigans* was not very common about the yellow fever Hospital, Domingos Freire, and on the first occasion that it was met with, there was coincident with it the occurrence of a spontaneous yellow fever case; *Stegomyia fasciata*, on the other hand, was abundant there."

Dr. Durham expresses himself as follows on this subject: "In this connection it is of interest to note that all the artificial gnat infections carried out by the American Commission were done during the daytime, *Stegomyia fasciata* being the species employed."

The experiments made in the Hospital of Sao Paulo (Brazil) were also carried out during the daytime.

Observers who have had the opportunity of studying the blood-thirsty instincts of *Stegomyia fasciata* will have remarked how great is the aidvity of this insect; it can easily be induced to bite during the daytime if a man or a mammal be exposed to its bite, even though it had previously sucked blood that was not yet digested.

Dr. Ficalbi mentions that one female *Culex elegans* (*Stegomyia fasciata*) cultivated in the laboratory sought to bite on the second day of its development as a mature insect. It bit on the third day and sucked itself full, and for the next three days it was occupied in digesting and passing excrement; on the fourth day after the first meal it again sucked itself full of blood, though the first meal could only have been partly digested.

Culex fatigans or *Culex pipiens* again bite in full daylight, and it is well known how difficult it is to render mosquitoes purely nocturnal.

We may therefore conclude that neither the *Stegomyia fasciata* nor the nocturnal mosquito loses the property of feeding in the day be it free or captive, after having sucked blood, whether it be healthy or "infected," according to the expression of Drs. Simond and Marchoux. If its natural avidity be augmented by a long fast it will not lose the opportunity of a meal during the daytime or any other period. It follows, therefore, that the theory of Simond and Marchoux, that seeks to explain the discrepancy between cause and effect in the new etiological theory of yellow fever, is a rare exception to the general rule, instead of a rule with but few exceptions.

A Case of Larvated Pernicious Malaria, by Dr. Micela Salvatore. *Gassetta degli ospedali e delle cliniche*, January 4th, 1903.—A soldier, the subject of subcontinuous malaria, which yielded readily to quinine, became whilst on duty suddenly cyanotic and unconscious, with slow feeble pulse. After being restored a second attack threatened on the second day, but being immediately treated the attack passed off. Salvatore believes that he had to deal with an intensely toxic form of æstivo-autumnal fever with extensive destruction of red corpuscles. He remarks that the subjects of latent malaria are liable to paroxysms of the disease from exposure to cold, emotions and injuries. Heat, however, is one of the most common accidental causes, and if the attack happens to be of the cerebral and comatose pernicious type, the signs and symptoms resemble those of sunstroke.

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THE

Journal of Tropical Medicine

August 15, 1903.

THE PHYSIQUE AND GENERAL CONDITIONS OF OUR CANDIDATES FOR THE ARMY.

A memorandum just issued by the Director-General, Army Medical Service, on the physical unfitness of men offering themselves for enlistment in the Army, merits most careful consideration. Sir William Taylor draws attention to the writings of Sir Frederick Maurice and others who have pointed out the alarming proportion of young men of our country, especially among the urban population, who are found unfit for military service on account of defective physique. As our soldiers serve for a large portion of their service in the Tropics, this statement, if true, demands a full enquiry as to the cause of this disability and its remedy.

Sir Frederick Maurice in a recent number of the *Contemporary Review* states that according

to the best estimate he has been able to arrive at, no more than two men out of every five wishing to enlist, and offering themselves for enlistment, remain in the Army as effective soldiers. Of the men presenting themselves for enlistment, some are rejected by the recruiting officer or sergeant, others by the medical officer, and others, although passed for enlistment, are summarily discharged after three months as unlikely to make efficient soldiers. General Maurice states that at the end of two years only 40 per cent. of the men who wish to become soldiers will be found fit for enlistment; that is, 60 per cent. of the candidates for military service are physically unfit for that service. The want of physique is, however, not only serious from the military aspect, but also from the civil; for as Sir Lauder Brunton has pointed out, many of them perpetuate this physical incompetence by marrying girls as weak as themselves, and thus the vicious chain is prolonged.

At the last meeting of the British Medical Association, Mr. Rowntree drew attention to the question of poverty in the lower classes, and he found that 28 per cent. of the population of York were living in poverty. Mr. Booth estimated some years ago that 30 per cent. of the London population were living in the same state. Supposing other towns to show similar characteristics, we see that over a quarter of our town population are living near the poverty line.

Sir W. Taylor, in his attempt at deciding whether the above state of the national health is a solid fact, points out, *first*, that the greater portion of our soldiers are drawn from the unskilled labour class, and so from that portion of the population living in or close to the actual poverty line. This being the case, we can easily see that the deteriorated physique of the town population is accounted for by the facts of insufficient food and unhealthy surroundings such as overcrowding, want of sanitation, &c., due to the existing poverty: other causes being alcoholic temptation so rife in a large town centre; tuberculous diseases from the overcrowding; and finally syphilis.

Secondly, are 60 per cent. of the men seeking to enlist unfit for military service? The decennium 1893-1902 was selected to determine this point. During these years 679,703 men were medically examined for enlistment, and of these 234,914 were rejected as medically unfit, or a ratio of 34·6 per cent. Of the men passed as fit 5,849 broke down within three months after enlistment, whilst 14,529 were discharged as invalids under two years' service; or a loss of ·9 and 2·1 per cent. respectively. How thoroughly the primary medical examination was carried out is shown by the small number of rejections within three months' enlistment. But the total of rejections comes to 37·6 per cent. of the 679,703 examined. This, however, will not represent the total number of rejections of candidates for enlistment, for it does not include those rejected by the recruiting sergeant. No official record is kept of these, however, and we have no means of knowing, therefore, whether the total would be brought up to the 60 per cent. of General Maurice, though it is probably the case that that number is approached.

Thirdly, the causes of rejection are chiefly for poor physical development in chest measurement, height and weight; and on looking at the table for the causes of rejection per 1,000 for 1891-1902, we are struck by the continually increasing number due to loss or decay of teeth, which rises from 10·88 in 1891 to 49·26 in 1902. That this is an important cause for rejection will be at once recognised when we consider the liability of our men to diseases of the digestive organs in India.

The above facts must cause us serious reflection. The causes of our inefficiency must be put down to the increasing number of our country population flocking to the towns, where failure to find means for properly rearing a family, ready scope for "wasting their substance in riotous living," and early marriages, result in the above deplorable facts. Also, as has been pointed out by a contemporary, the readiness with which the cheap American loaf is preferred to our English

bread must have a marked bearing on the case; for the former, although a larger loaf for the money, yet does not contain the same amount of nutritious material.

What remedy can be found for all this? The number of our able-bodied men must by some measures be stopped from their migration into the towns; and this is one of the consequences that seems likely to ensue from the wise views of the present Colonial Minister. Sir W. Taylor wisely refers the whole subject to the two Colleges for examination. Certainly the existing state of affairs is sufficiently serious for our national well-being, especially when we reflect on the fact that our Army is very largely an army destined to serve in tropical climates, and as such should be composed of the fittest material.

British Medical Association.

SECTION OF TROPICAL DISEASES.

Thursday, July 30, 1903.

TRYPANOSOMIASIS.

SIR PATRICK MANSON opened the discussion on trypanosomiasis by reviewing the various stages of the discoveries of the trypanosome parasite in man and animals. (1) In examining blood for trypanosomes, Sir Patrick stated that the best method was to obtain moderately thin films, which, after being fixed in the usual way, are stained by methylene blue, by thionin, or by Romanowsky's method, and using a $\frac{1}{6}$-inch objective. Many slides may have to be searched before a single parasite is seen. The best time to draw blood for examination purposes is when the patient is suffering from fever. (2) The clinical features due to the presence of trypanosomes in the blood vary considerably. In the native, Dutton states that no clinical signs or symptoms may be present, but in the European an irregular undulant fever obtains, having been ushered in by a sudden and marked rise of temperature. The further characteristics of trypanosomal fever are œdema, circinate erythema, muscular weakness, irritable pulse, anæmia, and breathlessness. Enlargement of the spleen is usual, and such conditions of the eye as choroiditis, iritis, cyclitis and optic neuritis. Mononuclear leucocytosis may or may not be proved to be a feature of the disease. (3) Sir Patrick drew attention to the possibility of certain obscure tropical diseases, such as sleeping sickness, kala-azar, and certain forms of enlarged spleen, being due to the presence of trypanosomes in the blood. He stated that probably the malaria parasites and *Trypanosoma Gambiense* infest other mammalian animals besides man, thereby explaining the endemicity of these diseases. The recent discovery by Castellani of the presence of trypanosoma in the cerebro-spinal fluid in cases of sleeping sickness requires to be carefully studied in view of the etiology of the disease. The leading facts in favour of this parasite being the cause of sleeping sickness are: (*a*) The frequency of the trypanosoma in the blood of persons suffering from sleeping sickness, at any rate in Uganda; (*b*) the occurrence of the parasite in connection with the nervous system; too much importance, however, must not be attached to this, as the parasite may occur in other fluids of the body besides the blood and the cerebro-spinal. Against the theory that trypanosomes are the cause of sleeping sickness it must be remembered that no European has been known to suffer from sleeping sickness, although a few are known to be, and many must have been, infected by trypanosomes. Moreover, the parasite has not been found in persons suffering from sleeping sickness in the Congo basin nor in West Africa. Castellani's suggestion that possibly the trypanosomes infecting natives and Europeans are of different species seems scarcely feasible. However it may be, that whereas the native man and beast are immune in a pathogenic sense, to the native trypanosome, the exotic European and European domestic animals are not so. The interval between infection with trypanosomes and the appearance of the symptoms of sleeping sickness, which sometimes extends to years, need not prove a negative, as in other specific infections, such as in leprosy, tuberculosis, rabies, &c., a long period of incubation seems proven. Judging all the evidence at present before us, Manson is inclined to the belief that the trypanosome of the African is not the cause of sleeping sickness. Whilst discussing the prophylaxis of sleeping sickness, Manson thinks that the inoculating agent may be a Glossina, a Tabanas or Stomoxys, or it may be caused by ticks. He also referred to the disease known as carrapato, met with along the Zambesi, and described by Sir Alfred Sharpe as existing near Lake Tanganykia. Whether carrapato is due to a trypanosome or not is not known, but it evidently is a disease produced by the bite of a tick—the *Argas moubata*.

Dr. C. CHRISTY, M.B., C.M.Edin. (Liverpool), read a paper on "The Distribution of Sleeping Sickness, and its Relation to *Filaria perstans* and to Trypanosomiasis." He pointed out that sleeping sickness was not so widely spread over Uganda or Busoga, as was generally supposed. It is met with along a narrow strip of coast, extending from the north-west corner of the Victoria Nyanza, along the Northern littoral of the lake, and on the eastern shore as far as German East Africa, in all some 250 miles.

Dr. Christy ascertained by blood examination made on the spot that sleeping sickness extended for more than 100 miles beyond the eastern limit of the area in which the *Filaria perstans* occurred in the blood, and therefore the filarial parasite could have no etiological relationship to the disease.

He had found a good deal of evidence pointing to the probability of a connection between sleeping never found the fly troublesome, but the tsetse-fly sickness and some species of Glossina (tsetse-fly). He

avoids towns, avoiding fæcal matter persistently; it is therefore in the agricultural districts in which the fly is met with, in the very regions, in fact, where sleeping sickness prevails. He observed a peculiar craving for food in human beings towards the end of the disease; in trypanosomiasis in horses the same obtained.

Drs. J. EVERETT DUTTON and J. TODD communicated a paper entitled "The Human Malady Trypanosomiasis." The authors, after examining 1,000 persons on the Gambia, found the trypanosoma in six natives and one white man (quadroon). The signs and symptoms of the disease were very mild and the number of parasites found in the blood were very scanty. The infection occurred in young and old; in young persons the usual enlargement of the spleen was met with and in some cases enlarged lymphatic glands were present.

Dr. C. CHRISTY read a paper "*Ornithodoros moubata*, and Tick Fever in Man." He came across the disease first at Toro in Uganda, and subsequently found that it was fairly common in Buddu, Busoga, Uganda, Unyoro, and also on the Nile. The tick which caused the disease was called *Bibo* by the natives. Mr. Pocock, of the British Museum, recognised it as identical with that which has long been known to be pathogenic in the Zambesi valley, the *Ornithodoros moubata*. Dr. Christy described the symptoms of the disease, which he was able to examine in one of his own servants. He always took the precaution of encamping far from native habitations, and was never bitten. Indeed, throughout his travels, this precaution was the reason that he did not suffer a single day's illness.

In examining the blood of his servant that had contracted tick fever he found *Filaria perstans*. This made him think that very probably *Ornithodoros moubata* was the intermediary host of *Filaria perstans*.

Dr. A. CASTELLANI, M.D. (Florence), said: The observations made by Sir Patrick Manson on sleeping sickness are very important. I quite agree with him that further investigation is needed, though personally, I am of opinion that sleeping sickness is a trypanosome disease. I shall not now enumerate all the facts which are in favour of this theory, but I regard the presence of a trypanosome in the cerebro-spinal fluid of sleeping sickness patients as a fact which bears out the idea of sleeping sickness being due to this parasite. In no other disease, as far as I am aware, does it occur in the cerebro-spinal fluid. Very interesting, I think, are also the observations of Dr. Sambon and Dr. Christy, concerning the geographical distribution of flies belonging to the tsetse-fly group, and sleeping sickness. These observations are also, I think, in favour of sleeping sickness being due to a trypanosoma.

G. C. LOW, M.B., C.M.Lond. (a member of the commission recently sent to East Africa by the Royal Society to investigate sleeping sickness), made the following statements: (1) He found that 50 per cent. of the aboriginal Indians in British Guiana had *Filaria perstans* in their blood, but sleeping sickness does not exist there. (2) On Dr. Low's arrival in Uganda he found that Drs. Wiggins and Hodges had already succeeded in proving that there were no cases of *Filaria perstans* in Kavirondo, where negro lethargy prevails. The habitat of *Filaria nocturna* is in the lymphatic system, whereas *Filaria perstans* is situated in the mesentery. There is no foundation in the theory that the embryos of the filaria agglomerate in the cerebral capillaries, thereby originating sleeping sickness. The fact must be borne in mind that in this disease other parasites are likewise met with, viz., ankylostomes, *Ascaris lumbricoides*, *Trichocephalus dispar*, *Bilharzia hæmatobia*, and *Filaria perstans*. Care must be exercised in arriving at a conclusion as to the cause of the disease, as evidence of the presence of old malarial parasites as well as trypanosomes assist in complicating the diagnosis.

The pathological changes induced by trypanosomes in the lower animals do not coincide with the pathological conditions of sleeping sickness in man, as set up by these parasites. The *post-mortem* macroscopic appearance of the meningeal changes in sleeping sickness bear a strong resemblance to those of ordinary septic meningitis. On a more minute examination, however, it is observed that the exudation consists of mononuclear leucocytes in the perivascular spaces in sleeping sickness, but of polymorphonuclear leucocytes, and not specially in the perivascular spaces, in septic meningitis. As to Dr. Christy's theory that *Argas moubata* is the host of *Filaria perstans*, Daniels has mentioned the fact that this filaria does not exist in British Central Africa. On the other hand, *Filaria perstans* is frequent in British Guiana, but *Argas moubata* is not found there. Dr. Sambon's assertion that the tsetse-fly is always found near water does not coincide with Mr. Jackson's observation that the fly is encountered in dry districts covered with scanty bush.

L. W. SAMBON, M.D. (Naples), stated that according to E. Brumpt the bite of a tick, which probably is the *Ornithodoros moubata*, is much dreaded by the natives of Kilimandjero and the Galla country. He considered Dr. Christy's observations as to the remarkable disease inoculated by this insect in Uganda and the contiguous countries were very interesting. We possess no proof however, that this tick is the intermediary host of *Filaria perstans*. The possible trypanosoma origin of sleeping sickness is by no means negatived by its long period of incubation, as the same circumstance is observed in many diseases caused by protozoa. Dr. Sambon considers that the patchy distribution of sleeping sickness along the borders of streams and lakes corresponds with the peculiar distribution of the tsetse-flies. He is of opinion also, that the limitation of tsetse-flies to the vicinity of water is explained by the feeding habits of certain freshwater fish, some of which are amphibious, retreating into burrows in the daytime and feeding at night on grain and insects. Trypanosomes are commonly found in fish, more especially in those that live in mud. They resemble the trypanosomes of warm-blooded animals. The natives of Senegambia, Congo, &c., attribute sleeping sickness to the sting of a fish, or to eating fish with diseased gills. Though the *Trypanosoma Castellanii*, *Trypanosoma Gambiense*, and those of nagana and surra appear to be identical, it is within the bounds of possibility that they belong to different biological species; for when passed through

different hosts it is found that the trypanosome of nagana is considerably modified.

Capt. LEONARD ROGERS, I.M.S., is opposed to the view that kala-azar was a trypanosome disease. He considered it impossible to recognise trypanosomes by involution forms. He had had the opportunity of examining some hundreds of cases of kala-azar, but had never come across a trypanosome. The peculiar melanotic pigmentation found in the organs is characteristic of kala-azar, and such a pigmentation is a proof of the presence of an endoglobular parasite. The trypanosome lives in the plasma, and in surra the trypanosome produces no melanotic pigmentation.

LIVER ABSCESS.

I.—Fleet-Surg. P. W. BASSETT-SMITH, R.N., Lecturer on Tropical Diseases, Haslar, read a paper on "*Five Cases of Abscess of the Liver*," lately under treatment in the R.N. Hospital, Haslar.

Fleet-Surg. Bassett-Smith dwelt upon the value of systematic examinations of the blood for the presence of leucocytosis, a constant and most important diagnostic sign in the detection of deep-seated abscesses. He condemned leaving hepatic abscesses to undergo spontaneous cure, and advocated some form of open operation as the best mode of treatment.

In all the five cases dysentery was recorded, although in none had it been severe. Surg. G. Kirker, R.N., had operated upon three of the cases successfully. Two of the three were advanced cases, the pus pointing in the epigastrium. The abscesses were freely opened in the epigastrium and drained. In case 4 the liver was punctured in six places; no pus was found, yet four days afterwards the abscess burst upwards through the lung.

II.—Mr. JAMES CANTLIE, M.B., F.R.C.S., dealt with the advantages of operation by the trocar and cannula, and syphon drainage for deep-seated abscesses of the liver. He advocated transthoracic or abdominal incisions for far-advanced liver abscesses which were pointing at the side of the chest or in the epigastrium, but wholly condemned them for deep-seated abscesses. Mr. Cantlie contended that almost all abscesses of the liver were deep seated at first, the suprahepatic region or the centre of the liver being the usual seats of the early deposition of pus. For such cases the trocar and cannula was the safest method of dealing with abscess in those positions; and he considered that abscesses that were relieved by incisions were all examples of the operation having been too long deferred. Mr. Cantlie gave exact anatomical details of the position of the inferior vena cava, and explained how to avoid wounding this vessel when searching for pus.

Of the ten cases of liver abscess recorded by Mr. Cantlie, four were of the suprahepatic variety and were not of dysenteric origin; six were intrahepatic, and all were subsequent to dysentery.

Of the three fatal cases two had pyæmic organisms in the blood before operation, and were therefore almost hopeless. A third fatal case had a second abscess in the liver substance which had not been drained. Two interesting cases were also related by Mr. Cantlie: one in which he found pus which was proved at the *post-mortem* examination to have been extracted from pus in a branch of the portal vein—a case of pylephlebitis; in the other pus found its way over the dome of the liver from suppuration commencing in an appendicitis.

III.—Capt LEONARD ROGERS, I.M.S., read a paper entitled "*Biliary Abscesses of the Liver, with an Operation.*" By biliary abscesses Capt. Rogers means abscesses in the liver within the bile ducts, sometimes called suppurative cholangitis. He had seen three such cases in the *post-mortem* room at St. Mary's Hospital, in 1889. These cases suggested to him the possibility of saving some of these patients by an early operation consisting of opening the abscesses and draining the hepatic duct. He acted upon this in a case which presented itself in Calcutta in 1902. The patient had a history of occasional attacks of ague and repeated attacks of jaundice, preceded by severe pain, and the liver was very much enlarged. Before an operation could be performed, however, the patient coughed up a small quantity of pus. The gall-bladder was, however, opened and a number of small gall-stones removed, and a mass of gall-stones was found to occupy the hepatic duct within the liver substance. The patient did not, unfortunately, rally after the operation. At the *post-mortem* examination the bile ducts behind the obstruction were dilated and full of pus and the pus extended along the under-surface of the liver and through the diaphragm to the lung. Capt. Rogers believes had this operation been performed before the pus reached the lung the patient might have been saved, and considers such operations, for what is otherwise a positively fatal ailment, are to be commended.

LEPROSY.

Mr. JONATHAN HUTCHINSON, F.R.S. (London), gave an address on "*Leprosy.*" He stated that overwhelming evidence was opposed to the belief that leprosy spread by any ordinary mode of contagion, such as by touch, clothes, bites of insects, or wounds; that hereditary transmission, if it ever occurred, was rare; that commensal communication, that is, eating food contaminated by a leper's hands, occurred occasionally, but was by no means frequent; that in all countries where leprosy was not common a great majority of the cases were *de novo*, in the sense that there had been neither inheritance nor any exposure to risk of contagion; that the facts pointed to leprosy being caused by some article of food; that there was no food which could be reasonably suspected, excepting improperly cured fish; and that the very excessive prevalence of leprosy in Roman Catholic countries supported this conclusion. He contended that the report of the Leprosy Commission in India might be taken as conclusive on the point that it was not hereditary; the children of leper parents are not leprous. His experience in South Africa led him to the belief that lepers should not be allowed to engage in any industrial occupation connected with food; but they might assume that leprosy was not commonly contracted in this way. Many Norwegian lepers had lived their lives out in the Western States of

America, and in no single case had leprosy spread from any of them; and in England he supposed there were at least 100 lepers who were not observing any special precautions. Among Kaffirs, who lived in the most careless manner, there was greater risk; but among civilised communities, where eating was carefully regulated, he did not think there was risk at all. The fact that no nurse or anybody connected with a leper asylum ever contracted the disease was evidence on the point that leprosy did not spread by any ordinary means of contagion. In many leper asylums visitors were freely admitted. The present belief in the contagiousness of leprosy was based on the discovery of a bacillus, but the facts show that the disease is not contagious. He had visited a vast number of leper hospitals, he had sat in their wards for hours, he had taken his son and his daughter with him. When he went to South Africa he was told by a high authority, "We have no leprosy here; go to India;" but the fact was that in Cape Colony there were four lepers per 10,000 of the population—almost as large a percentage as in Norway or India. Dr. Hansen, the advocate of the contagious theory, admitted that a great number of Norwegian lepers stated that they had never been exposed to contagion. Husband and wife, one of whom was a leper, might live together for years without the other being affected. It was acknowledged that it was very rare for both husband and wife to be lepers. Leprosy was the same disease all over the world under every variety of climate or habit of life. It must consequently be dependent on something that people consume. Every article of food could be eliminated as not being eaten by all leprous persons, with the exception of fish. Taking those places where leprosy was most common, leprous people lived on fish which was in all stages of decomposition. Fifty years ago herrings were consumed by the Norwegian peasantry in a half rotten condition; the people had acquired a taste for them in that condition. In various parts of the world he traced leprosy to peoples who consumed decomposed fish, and he showed that in the leprous asylum at Matunga, Bombay, the Jain people, who were vegetarians, were not represented, and the Hindus and Mussulmans were in far less proportion than the Christians.

Dr. Marcus Fernando (Colombo), from his observations in Ceylon, could not agree that leprosy was altogether non-contagious, nor did he believe that tainted fish was a cause of the disease.

Dr. F. M. Sandwith (London and Cairo) agreed that husband and wife need not contract the disease one from the other. Mahomed said, "Fear a leper as you would a roaring lion," but Mahomedans had forgotten this teaching, and they had to-day no fear at all of lepers. So far as he knew, there was no other theory except the fish theory for the cause of leprosy. Certainly in Egypt there was very much stinking fish, and it was impossible to get away from fish-eating people. He would put the proportion of lepers in the population at four per 10,000. Dr. Sandwith recorded an instance of a boy leper who had never eaten any fish in his life as an argument against the fish theory.

Sir Patrick Manson (London) said that Mr. Hutchinson reminded him of John the Baptist crying in the wilderness. He would confess he was not one of Mr. Hutchinson's disciples. He wished Mr. Hutchinson had dealt with the subject from the pathological point of view, and explained how the bacillus got into stinking fish. A better plan to solve the cause of leprosy would be to hunt up the origin of the leprosy bacillus. If it were introduced into stinking fish, why should it not be introduced into fresh fish? It might be supposed that it existed in fish before it became rotten. Leprosy and tuberculosis are similar diseases. The leprosy bacillus is not inoculable and the tubercle bacillus is inoculable with great difficulty. The incubation period of both is a lengthy one and there were many points to show that leprosy and tuberculosis were similar diseases. Tainted fish may be associated with leprosy, but only in a very indirect way.

Dr. Phineas S. Abraham (London) said he was especially touched by Mr. Hutchinson's appeal against "those terrible leper prisons." He approved of the segregation of advanced cases, but that early cases of the disease should be practically put in prison seemed a monstrous step. Dr. Abraham deplored the resuscitation of the term "*de novo*," as it could only lead to misunderstandings and confusion. He read a letter from Dr. Ehlers, of Copenhagen, concerning Mr. Hutchinson's theory as to the tainted fish origin of the disease. Dr. Ehlers refuses to accept the theory.

Mr. James Cantlie (London) holds that in the later stages leprosy is contagious. He had known a girl contract leprosy by attending as a nurse upon her leprous father (European), whilst the mother, who held aloof, did not contract the disease. A European, sleeping beneath the same blanket with his leprous Chinese boy on board a houseboat in China, had developed the disease; on the other hand, in the leper village in Canton, he had seen a woman who had lived in the village for twenty-five years, and had three leper husbands, but had never contracted the disease. The similarity of the lepra and tubercle bacilli led Mr. Cantlie, as long ago as 1892, to state that he looked upon leprosy as a phase or form of tuberculosis. At first the idea was ridiculed, but he finds now that many of the leading observers are inclined to agree with the statement.

Dr. Sambon (London) commented upon the discrepancy in Mr. Hutchinson's argument, as he recognised the lepra bacillus as the cause of leprosy, yet he ascribed the production of the disease to the consumption of badly cured fish. Whilst asserting that the bacillus is swallowed with impunity in fruit or other food that have been handled by lepers, Mr. Hutchinson holds to the belief that the bacillus can be introduced into the body by eating fish that has been salted, dried and cooked. The geographical distribution of leprosy and its sudden appearance in, and disappearance from, several islands are all against Mr. Hutchinson's theory.

John D. Hillis, F.R.C.S. (London), from extensive experience of leprosy in British Guiana, stated in 1881 concerning the theory that fish eating caused leprosy, "this theory should now be laid aside as obsolete,"

and he had heard of nothing in the history of leprosy to alter that statement. In British Guiana when he first went there the authorities were guided by the "celebrated but unfortunate report on leprosy by the Royal College of Physicians in 1867." The report held that the disease was not contagious, segregation was unnecessary, &c., &c. Lepers were allowed to roam at will, and to intermarry. Subsequently, owing to the prevalence of leprosy, Mr. Hillis succeeded in obtaining a modified form of segregation in the colony, with highly beneficial results.

Mr. Hutchinson replied that on all hands in India he was informed that the Jains, who were the only vegetarian race, were free from leprosy, and that only one case of leprosy among them was known. He was convinced that it was because they were now curing their fish better than was formerly the case in Norway that leprosy there was decreasing. As to the statement that leprosy existed in districts where no fish was eaten, he would like to be informed of any such district. The evidence was overwhelming that leprosy arose from fish-eating.

Lathyrism.

A paper on "*Lathyrism*" was read by Major A. G. Hendley, I.M.S., who is of opinion that Scheube's description best sums up the nature and etiology of this disease: "Lathyrism is a disease of the nature of an intoxication with a spastic spinal paralytic course, which is attributed to poisoning with various kinds of the family of *Papilionaceæ lathyrus* (chick pea or common pulse)."

At the end of July, 1893, Major Hendley happened to visit a village where paralysis of the limbs affecting about 10 per cent. of the male inhabitants had set in suddenly since the commencement of the rainy season. The disease proved to be lathyrism induced by the poorer labourers for the past eighteen months having had to subsist largely on lathyrus rations, the regular crops having failed. During the terrible famine of 1896-97, Major Hendley again came across this disease, the poorer agricultural labourers having been driven to consume lathyrus, the cheapest foodstuff to be had. In Famine Relief Camps of some 4,000 persons, one or two hundreds of cases of lathyrism were always observable. As to the etiology of the disease, Major Hendley is convinced that the paralysis is in some way due to intoxication with lathyrus, though other theories as to causation have been advanced, and Manson has suggested that the disease may be due to the entrance into the body of a toxin generated by germs, the habitat of which is outside the human organism.

Tropical Malaria and its Prophylaxis.

H. Marcus Fernando, M.D.Lond. (Colombo), stated in his paper that the chief difficulty in regard to combating the spread of malaria in Ceylon is the method of cultivation required for the growing of rice. Malaria is most frequent in the low-lying and sparsely populated parts of Ceylon situated to the north and east of the island. There is a remarkable relation between the periodical outbursts of the disease and the rainy season.

Tropical or æstivo-autumnal fever is by far the most frequent type met with, averaging 99 per cent. of the total cases. Quartan fever is not acquired on the island; benign tertian is occasionally met with, and is most often encountered in patients from Central or Northern India. It therefore appears that in places where the average temperature is rarely below 80° F. only the tropical forms of the parasite are generated, of which one noteworthy characteristic is their comparative rarity in the peripheral circulation. Dr. Fernando shows how impracticable it is in such agricultural centres as Ceylon to exterminate the Anopheles mosquito, but suggests that quinine be administered prophylactically as an alternative, and he quotes the examples of the success of quinine administered to persons not only during the actual fever, but two or three times a day for a month after recovery. He has arrived at the conclusion that malaria disappears from a district or community where quinine treatment is brought within the means of the poor. It is wholly impractical to attempt the extermination of the Anopheles in the rice-growing districts of the Tropics; but this is quite a secondary necessity, as is proved by the fact that Anopheles are present in many districts whence malaria has disappeared.

H. D. McCulloch, M.B., Chief Medical Officer N.G.S. Railways, India, read a paper entitled "*A Plea for the Proper Medical Supervision of 'Refreshments' purveyed on Railways in the Tropics, with Special Reference to India; and for Better Latrine and Lavatory Accommodation for the Travelling Indian Public.*"

Dr. McCulloch is of opinion that our medical members of Parliament, assisted by the General Medical Council, should urge the Government to send a special commissioner and medical expert to India to inspect and report upon the medical administration of the railways of that country in the interests of public health.

The question of food supplies to travellers *en route* to the East is an important one, and the risks run by the traveller through quenching his thirst with any drink available are considerable, as water is frequently contaminated by organic refuse, &c. Infected milk is another source of danger, and tinned salmon, lobster, bully beef, &c., being stale, have been known to cause ptomaine poisoning.

Dr. McCulloch quotes an editorial in the Journal of Tropical Medicine, June 15th, 1903, entitled "*The Care of Invalids on Ships*," and mentions the applicability of the steps recommended in the article to the case of persons travelling on Indian railways.

(*To be continued.*)

Dr. Alfred Eddowes, at the Annual Meeting and Conference of the Dermatological Society of Great Britain and Ireland, held on May 27th, 1903, showed a coloured drawing of three so-called "veldt sores" contracted by a soldier during the South African campaign. Sections under the microscope proved the cause to be an endo-tricophyton.

A MONOGRAPH

OF THE

TSETSE-FLIES

[GENUS GLOSSINA, WESTWOOD]

BASED ON THE COLLECTION IN THE BRITISH MUSEUM

BY

ERNEST EDWARD AUSTEN

WITH

A CHAPTER ON MOUTH-PARTS

BY H. J. HANSEN, PHIL. DOC., COPENHAGEN.

With 9 Plates and 16 Figures in the Text.

Pp. 319. Price 15s.

LONDON:

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1903.

This admirable monograph has appeared at a most opportune moment. The fact that the trypanosoma parasite attacks man has been abundantly proved during the past twelve months, and as the tsetse-fly is known to be the intermediary host of this parasite in the case of horses and cattle, the possible relationship of the fly to human trypanosomiasis is apparent.

The text is arranged in six chapters. Chapter I. is devoted to the Bionomics of Tsetse-flies (genus *Glossina*); Chapter II. gives a historical survey of our knowledge of the tsetse-fly and the ravages it has caused in South Africa. Chapters III. and IV. deal with the systematic position and description of the genus *Glossina*. In Chapter V. Dr. H. J. Hansen, of Copenhagen, gives a systematic and complete account of the mouth-parts of Glossina and Stomoxys. Bibliography is the subject of Chapter VI. and occupies no less than 145 pages of the book. As appendices we find arranged in Chapter VII. articles by Lt.-Col. Bruce, Captain Richard Crawshay, and Dr. Cuthbert Christy. The beautiful drawings by Mr. A. J. Engel Terzi present us with accurate representations of tsetse-flies and are quite a feature of this comprehensive and interesting monograph.

As indicating the scope and importance of this work, we cannot do better than quote the Preface by E. Ray Lankester, F.R.S., Director Natural History Department, British Museum:—

"The Trustees of the British Museum have authorised the preparation and publication of the present work in view of the great practical importance of an accurate knowledge of the genus of flies to which Wiedemann gave the name Glossina. The discovery by Colonel Bruce of the fact that the common tsetse-fly of South Africa produces the death of horses and cattle rightly ascribed to its attacks by introducing into the blood of its victims a minute parasite, the *Trypanosoma Brucei*, has been followed by the discovery of similar parasites in the Indian disease known as surra, in the mal de caderas of South America, in the dourine of Algeria, and, lastly, in the blood of human subjects. The last and most important discovery is that by Castellani of the occurrence of a trypanosoma in the cerebro-spinal fluid of nearly 70 per cent. of the cases of sleeping sickness examined for this purpose by him at Entebbe, Uganda, in the early part of this year. It is estimated that 30,000 of the native inhabitants of the Uganda Province have died of the sleeping sickness since its sudden appearance among them two years ago.

"We are not yet sufficiently acquainted with the facts as to the distinguishing characteristics of the different species of trypanosoma concerned in causing these diseases. Nor do we know in any case, excepting that of the nagana disease, what is the nature of the insect (if insect it be, as is probable) by which the trypanosoma is introduced into the blood of a previously healthy animal or man. In the case of the nagana disease, we know that a tsetse-fly—*Glossina morsitans* of Westwood—is the habitual and specific carrier of the parasite. Even though other blood-sucking insects

may occasionally act as intermediaries and pass on the nagana parasite from one animal to another, it is to *Glossina morsitans*, and possibly also to *G. pallidipes*, that the disease owes its prevalence in special localities, and it is apparently these species which Colonel Bruce used in his experiments.

"The question immediately arises as to whether the other species of Glossina are carriers of disease germs and whether other species of trypanosoma, especially that found infesting the human blood and cavitary fluids, are carried by species of Glossina or tsetse-fly.

"An accurate knowledge of tsetse-flies is clearly indispensable for further progress in this inquiry.

"Inasmuch as the genus *Glossina* is found only in Africa, it is certain that in India and in South America other carriers of the trypanosoma must be at work. At present, though it appears that Stomoxys and some other 'biting flies,' not scientifically determined, have been experimentally shown to be *capable* of carrying the trypanosoma of surra and of nagana from one animal to another, no constant association of any genus or species of fly with these trypanosoma diseases has been suggested, excepting that of Glossina, with the African nagana disease.

"In view of the fact that the trypanosoma parasite is not observed to undergo any developmental changes within the tsetse-fly similar to the changes which the malaria parasite Laverania undergoes in the body of the gnats of the genus *Anopheles*, it is not unreasonable to suppose that there is no such exclusive bond of association between Glossina and Trypanosoma, as there is between Anopheles and Laverania. Other carriers may serve for trypanosoma, though Laverania must have Anopheles and no other

"On these points we require further observation. Collections from all parts of the world of flies (and other insects) which suck the blood of human beings and other animals are needed, accompanied by careful notes as to habits, locality, and life-history. Such collections will be received with special welcome, and at once investigated if addressed to me, here. It is clear that an accurate and comprehensive study of blood-sucking organisms, in view of their possible action as carriers of disease, has become a matter of the most urgent public importance.

"As an illustration of the significance of the discrimination of the different species of blood-sucking flies, I may mention that whilst these lines are in the press, I have received from Colonel Bruce a small box of biting flies taken at Entebbe, Uganda, where sleeping sickness is now rife. Among these Mr. Austen has determined one horse fly (*Tabanus* sp. incert.), and ten tsetse-flies (five males and five females) of the species *Glossina palpalis*, Rob.-Desv.

"This particular species of tsetse-fly is essentially a West African species, known from the Gambia to the Congo. It certainly suggests the need for an inquiry into the possible connection between this fly and the sleeping sickness, when we remember that that disease has been established for years on the West Coast of Africa, but was unknown in Uganda until two years ago. Sir Henry Stanley met with 'tsetse-fly' for a long distance on the Upper Congo, and it is suggested by Mr. Austen that *Glossina palpalis* reaches Uganda by way of the valleys of the Congo and Aruwimi."

Correspondence.

To the Editors of the Journal of Tropical Medicine.

Dear Sirs,—Enclosed is the photograph of a child with molluscum fibrosum, a rather uncommon disease in a child, I believe. The growth consists of several sessile or semi-pedunculated nodules on the chest, arms, and legs. The skin is raised by the overgrowth of its fibrous stratum, and has a shining appearance, and has somewhat lost its colour over the nodules. No history of yaws, syphilis or malaria was obtainable.

Yours very truly,
O. Browne,
Colonial Medical Service.

Elmina Castle, Gold Coast.

Molluscum fibrosum in a Child, a Native of the Gold Coast.

STUDENTS AND SOME OF THE STAFF OF THE LONDON SCHOOL OF TROPCIAL MEDICINE.—12th Session, May-July, 1903.

TOP ROW—J. W. McNean, J. Macintosh, H. Macfarlane, H. Vallance, J. W. Barrack (Junior House Surgeon), A. E. Ireland, C. J. Gomes, G. B. Warren (Laboratory Assist.).
SECOND ROW—Dr. Steel (Demonstrator), Robert (2nd Laboratory Assist.), J. Halley, W. Thomson, F. W. Whyte, A. C. Parsons, D. W. Purkis, H. E. Garrett, G. C. Strathairn, P. H. Ross, H. G. Ellery.
THIRD ROW—Dr. Ross (Sen. House Surgeon), Miss Sibtree, Miss Scott, Dr. Sambon (Lecturer), Sir Francis Lovell, C.M.G. (Dean), Prof. Salmonsen (Copenhagen), Mrs. Salmonsen, Sir Patrick Manson, K.C.M.G. (Lecturer), Miss Moloney, Mrs. Joyce, Miss Soltau, Mr. Goadby (Lecturer).
FOURTH ROW—J. Donald, A. D. Thompson, Dr. Low (Med. Supt. & Tutor), G. R. Twomey, Charles (Laboratory Boy).
ABSENT—J. F. Bullin, B. C. Broomhall.

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Notes and News.

Sir Ernest Cassel having given a large sum of money to the Egyptian Government for the relief of ophthalmia in Egypt, it has been decided to send travelling dispensaries into the country for the relief of those sufferers from eye diseases who are unable to attend the already existing hospitals. If the experiment is successful the number of dispensaries will be increased. Mr. A. F. MacCallan, M.B.Camb., F.R.C.S. Eng., has been appointed by the Egyptian Government to organise and direct the enterprise, with the title of Inspector of Travelling Ophthalmic Dispensaries in Egypt.—*Hospital*, June 20th, 1903.

Mosquitoes and Dengue.—The Board of Health of Honolulu, acting upon the belief that dengue, which is now prevalent in the Hawaiian Islands, is spread through the agency of mosquitoes, has instituted a crusade against these enemies of the human race. The results of their warfare will be watched with interest.—*Med. Record*, August 1st, 1903.

A Complimentary Dinner to Mr. Jonathan Hutchinson, F.R.C.S., F.R.S., LL.D., was given by members of the medical profession at the Trocadero Restaurant, London, on July 23rd, 1903. Sir H. Greenway Howse, F.R.C.S., D.Sc., occupied the chair. The toast of Mr. Hutchinson's health was proposed by the Chairman and spoken to by Dr. Robert Barnes and Sir Joseph Fayrer, Bart. The day chosen for the Dinner was the seventy-fifth anniversary of Mr. Hutchinson's birthday, and every speaker was able to congratulate the guest of the evening upon the retention of those eminent faculties, which, through fifty years have served to maintain Mr. Hutchinson in the foremost rank of clinicians and of scientific workers throughout the world. When Mr. Hutchinson retires from work, which we hope is not just yet, he will leave a gap in our professional ranks impossible to fill.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Dengue.

Dengue in Hawaii.—Dengue is reported epidemic in Honolulu and other parts of the Hawaiian Islands. In Hilo the court was adjourned for a week at the end of June because of the illness of so many jurors, lawyers, and court officers. The mosquito is believed to be the active agent in the transmission of the disease.—*Med. Record*, July 18th, 1903.

Leprosy.

Bericht über das Vorkommen des Aussatzes (Lepra), der Schlafkrankheit, der Beri-beri, &c., in Kamerun (Report on the Occurrence of Leprosy, Sleeping Sickness, Beri-beri, &c., in Cameroon), by Dr. Hans Ziemann. *Deutsche Med. Wochenschrift*, 1903, No. 14.—According to the experience of the author, leprosy is common in the hinterland of Cameroon. Both forms are seen, and as the natives consider the disease infectious, lepers are removed into the bush, where they colonise. The statements regarding sleeping sickness and beri-beri are founded on communications from negroes, but it is undoubtedly true that sleeping sickness is prevalent over wide tracts of the hinterland. A sort of beri-beri occurs in Cameroon, and the persons most affected are the labourers and prisoners who live principally upon rice and dried fish.

A Diagnostic Examination of One Hundred and Fifty Cases of Leprosy.—J. T. McDonald (*Journal American Medical Association*, June 6th, 1903) has come to the following conclusions : (1) The microscope is the supreme agent of the final diagnosis of leprosy. No patient should be committed to a segregated colony without a bacteriological demonstration of the disease. (2) Of clinical symptoms, maculæ, chiefly leucodermic spots, are found in 89 per cent. of all cases. (3) The lepra nodule, found in 74 per cent., is the one chief distinguishing lesion of skin leprosy. (4) Thinning, or complete loss, of eyebrows and lashes is present in 63 per cent. (5) Atrophic changes in hands and forearms, with retraction and contraction of fingers and enlarged ulnar nerve, in 32 per cent., is a leading feature of nerve leprosy. (6) The plantar ulcer, found in 26 per cent., usually on the ball of the foot. (7) Absorption of phalanges in 16 per cent., with occasional spontaneous amputation. (8) Elephantiasis of hands and feet in 16 per cent. (9) Facial paralysis in 11 per cent. (10) The entire body should be carefully tested for anæsthetic areas. (11) Several of the above symptoms can be found in some slight degree at least in every leprous subject.

Malaria.

A Rare Form of Masked Fever.—Vincenzo Piazza Martini concludes from his observations that nephritic colic, due to malaria, or fever masked under nephritic colic, has a definite clinical form. It occurs at regular intervals, sometimes even daily, now in the right and now in the left kidney, in persons who have had malaria. The pain may be accompanied by the malarial splenic tumour, and may coincide with the emission of uric acid crystals, which is a mere coincidence. The pain differs from that of nephritic colic due to calculus in that it is not accompanied by vesical disturbances ; it disappears with quinine treatment and does not recur after the prolonged administration of arsenical preparations.—*Gazzettta Siciliana di Medicina e Chirurgia*, December 1st, 1902.

Plague.

Some rats infected with bubonic plague were discovered in a store in Sussex Street, Sydney, in the middle of May. It is highly satisfactory to know that this discovery has been made as the result of the un-

ceasing activity of the expert staff of the Board of Health. Since the last outbreak the rats have been constantly examined, but no infected ones have been discovered until recently. It appears most probable that the disease among the rats has been re-imported.—The *Aust. Med. Gaz.*, May 20th, 1903.

Sleeping Sickness.

THE Portuguese Commission for the investigation of sleeping sickness has completed in Lisbon the work commenced in Angola. The book published conjointly by Bettencourt, Annibal, Ayres Kopke, Gomes de Rezende, and Correia Mendes, consists of 138 pages, and contains one map, five tables, and a number of illustrations. The points especially considered are the history and geography of the disease, and the clinical and prominent pathological conditions that are present. The authors deny the connection of the disease with infection by manioc, and demonstrate the difference between poisoning by prussic acid and badly kneaded manioc bread. The observers succeeded in cultivating on various media, to which was added ascitic fluid, the particular streptococcus (termed by them hypnococcus) which they regard as the cause of sleeping sickness. They only found *Filaria perstans* in two cases of forty-one examined for this parasite.

Various therapeutic agents were employed for the relief of sleeping sickness patients, but with no effect, though there was a slight improvement in one case injected with Marmorek's serum. Attempts have, however, been made for many months to produce a specific serum, and the following experiment has been tried: One mare was inoculated with dead cultures, another with highly virulent cultures; the latter can already bear 50 ccm. without exhibiting symptoms of disease.

The prophylaxis recommended is isolation of the sick, disinfection or burning of the dwellings and articles used by the sick, separate utensils and dishes, improvement of the social and hygienic conditions of the natives, &c. The authors deny Castellani's statement that the streptococcus is only observed a few hours or days before death. According to a table published by them the hypnococcus was, on an average, observed in the glands seven months before death and in the cerebro-spinal fluid five months before death.

The authors consider that Castellani's discovery of the trypanosoma is worthy of earnest consideration. On re-examining their blood preparations the authors found trypanosomes in four cases out of twelve; in cerebro-spinal fluid, however, which was not removed by Castellani's method, they failed to find the parasite.

The Vera Cruz Yellow Fever Report.

BULLETIN No. 13 of the Yellow Fever Institute has recently been published and it contains the "Report of Working Party No 1; a Study of the Etiology of Yellow Fever."

The conclusions arrived at by the Commission are as follows: (1) Bacteriological examination of the blood of persons with yellow fever during life, as well as of the blood and organs immediately after death, in uncomplicated cases, is negative. (2) The mosquito known as *Stegomyia fasciata*, when allowed to suck the blood of a yellow fever patient after the lapse of forty-one hours and a half after the onset of the disease, and subsequently fed on sugar and water for twenty-two days and an hour and a half, can, if permitted to bite a non-immune person, produce a severe attack of the disease. (3) *Stegomyia fasciata* contaminated by sucking the blood of a yellow fever patient, and then killed, cut into sections, and appropriately stained, presents with regularity a protozoan parasite, *Myxococcidium stegomyiæ*, that can be traced through a cycle of developments from the gamete to the sporozoite. (4) *Stegomyiæ* fed on the blood of a person with malarial fever, on normal blood, or artificially, do not harbour the myxococcidium.

As to the important question of whether *Stegomyia fasciata* is or is not the only medium of transmitting the disease, the report expresses itself as follows: "To prove a negative assertion, conditions must be supplied to produce the disease at will or under constant conditions. In the whole history of the disease such data, to this date, are wanting. When one instance occurs and can be repeated, the new factor can then be taken into consideration."

The Journal of Tropical Medicine.

CONTENTS.—SEPTEMBER 1st, 1903.

Original Communications.

OBSERVATIONS ON AKATAMA, A WEST CENTRAL AFRICAN DISEASE.

By FREDERICK CREIGHTON WELLMAN, M.D., A.B., C.F.M.

THE disease I wish to describe, while at present somewhat of an enigma to me, especially in the matter of its etiology, may be known to some of the readers of the JOURNAL OF TROPICAL MEDICINE, so I write with the dual hope of bringing to the notice of tropical workers an affection which is, so far as I know, yet undescribed, and of hearing from some one who may have met with the condition and been more successful than I in studying it.

On my arrival in this district, July, 1896, a number of natives suffering from the disease called by them *Akatama* came for some time to my dispensary; but as I succeeded in relieving none of them they gradually fell off in their attendance. However, from that time to this I have met with occasional cases, and have in all examined hundreds of natives affected with the trouble. I have made, and have by me, notes on some of these cases, from which the following description is compiled.

Name.—The name given the disease by the native is, contrary to the general rule, without significance. Native terms for diseases are generally descriptive. The name I have used in keeping my records is *neuritis peripheralis endemica.*

Definition.—An endemic peripheral neuritis of obscure origin, characterised by numbness and intense prickling and burning sensations in the presence of cold or damp, which are temporarily relieved by the application of dry heat.

District and People Affected.—*Akatama* is found all over the territory occupied by the Bihé, Bailundo and Andulu peoples, with their allied tribes. How much further it extends I do not know. The district mentioned lies 13° to 14° south, and is a plateau ranging from 5,000 to 6,000 feet above the sea-level. The climate is, in consequence, cool as compared with other sections in the same latitude. In damp localities even slight frost is found at one season of the year. The people are Bantus, numbering about 200,000, and physically superior to the surrounding tribes. The staple article of food is maize, eaten in the form of thick, partially cooked mush, with small quantities of boiled beans, cassava leaves, or meat, as a relish. The dress of the people, men and women alike, is a skirt or cloth falling from the waist to the knee. Quite recently many of them affect a shirt in addition to this. The people are porters by occupation, and are of a very contented and equable disposition.

Economic Importance of the Disease.—While the trouble affects young and old, male and female, the economic significance of it lies in the fact that good porters and servants are rendered inefficient by it, often to the hindrance of necessary work. An otherwise good porter would rather receive a beating than start out with *Akatama* before the sun is high. He hangs over the fire mornings and evenings and on rainy days. Conversely, a servant absolutely worthless on a cloudy day may give his usual service while the sun is shining, or while he can be employed near a fire. *Akatama* is found oftener in men than in women, in the young and middle-aged than in the old, and not at all in children and Europeans.[1]

Frequency.—From 3 to 5 per cent. of the population are affected.

Etiology.—Following is a digest of the notes of my observations in thirteen cases who chanced to be within call when I began to prepare this report, and of whom I have been able to make systematic examination.

It will be seen from the following table, showing the results of microscopical examination of the blood and excreta in a series of cases, that no specific and universal cause is evident. In one or two cases where there was heavy cough I likewise examined the sputum, but with negative results. Locally I found nothing which throws light on the cause of the disease.

[1] I have never seen the disease in a Caucasian, although I examined a number of officers, missionaries, traders, &c., every year.

No. of Case	Blood			Fæces			Urine
	Presence of Malaria		Filariasis	Ascar. Lumb.	Ankylos. D.	Tænia	
	*Plasmodium	Dif. Leuc. count					
1	—	—		—	—	—	—
2	Malig. ter., ring form	—	—	Yes	—	—	Albumen.
3	—	†Yes	—	·	—	—	..
4	—	Yes	—	—	—	—	—
5	Malig. ter., ring form	—	—	—	—	—	Bilharzia hæmatobia
6	—	—	—	Yes	—	Yes	·
7	—	Yes	F. perstans	Yes	—	—	—
8	—	—	—	Yes	—	—	—
9	Malig. ter., ring form	—	—	—	Yes	—	—
10	Malig. ter., ring form	—	—	—	Yes	—	—
11	—	Yes	—	Yes	—	—	—
12	—	—	—	Yes	—	—	—
13	—	—	—	—	—	—	—

* When the parasite was found no count of leucocytes was made.

† *I.e.*, mononuclears 20 per cent. or above.

I take it that the filariasis, ankylostomiasis and Bilharzia disease were adventitious, and of course the malaria is to be taken for granted ; so I should be inclined to say that the table represents a fair average of the natives in the district, and that in any similar group practically the same conditions would obtain.

So much for facts. As to theories, I have held many. Some of the most probable would seem to be :—

(1) That *Akatama* is caused by exposure to sudden changes of temperature, *e.g.*, from warm sun to cold rain, and especially from the warm sand of the paths into cold streams. Also the great change from the cold mornings and evenings to the heat of the day. The fact that the trouble first appears on the most exposed parts, *i.e.*, arms and legs, would seem to support the above hypothesis. Against it would appear the fact that girls, the infirm and the aged, besides others who are little exposed, are likewise subject to the disease.

(2) Another theory is that *Akatama* is an intoxication analogous to beri-beri. This intoxication might be from micro-organisms in food or soil, or it might be accounted for by the fact that the maize eaten is always allowed to partially ferment as a part of the process of preparing it for food. In a case with pretty general implication of the surface of the body this idea impresses one reasonably. When you find the trouble confined to a small part of the body a local cause would seem to fit the facts better. Again, there are no motor symptoms. I do not find *Akatama* particularly a "place disease," nor that change of residence necessarily has any effect on it.

(3) A third theory is that the symptoms are the result of nerve starvation, as the natives are a poorly fed people. This is not borne out by the facts. The chiefs, the rich and the well-fed suffer alike with the poor ; and treatment founded on this last supposition has not succeeded in relieving the symptoms.

Pathological Anatomy.—While there is found during the exacerbations of pain, &c., some swelling, erythema and, in bad cases, slight œdema, which may persist for a little while after the spasm has passed, yet neither macroscopical nor microscopical (sections) inspection of the skin reveal anything either in the way of neuromata or of connective tissue change. Sections and teased preparations of nerves from a patient who died of another disease showed none of the characteristic changes found in the nerves of old beri-berics. Yet the severity of the symptoms and their character indicate that *Akatama* is a true neuritis and not a neurosis. Further work with the microscope may show organic changes which I have overlooked.

Symptoms.—(1) Subjective : shooting, prickling, "crawling" pains in the affected parts, accompanied by numbness. These are relieved by the heat of the sun or a fire. The combination of wet and cold seems to greatly intensify the suffering. The patients often say, "When I step on a cold damp place it is awful." (2) Objective : The erythema is of course particularly noticeable on light-coloured natives. There is often some swelling, which generally quickly subsides as the patient gets warm over a fire or in the sun. Excessive sweating of the affected part is sometimes noticed. These symptoms generally appear on the legs and forearms, sometimes also on the thighs and arms, and occasionally on any part of the body, or all over the body. In severe cases the walk is peculiar—a tendency to curl the toes as if walking on the heels and ends of the toes. I have seen several bad cases who could not walk at all in cold weather.

Diagnosis.—The diagnosis is easy. The patient is generally in no doubt as to the nature of his trouble, and extremely willing to inform you of it. Differential diagnosis : There are a few things for which *Akatama* might be mistaken. (1) From beri-beri. No pain in calves, lumbar region, &c., on pressure ; no heart symptoms ; œdema slight and transitory (not always present) and no atrophy. The peculiar walk is from the pain and is very different from beri-beri walk. The reflexes are normal, and there is no ankle drop. (2) From other paralyses. The limping walk is not always the same. It is sometimes on one side and sometimes the other. It is not ataxic, and is a transitory symptom. (3) From elephantiasis. The swelling in *Akatama* is slight and transitory, and examination of the skin shows no structural changes. (4) From malarial pains. By examination of the blood. Not amenable to quinine.

Prognosis.—Good as to life and general health, uncertain as to relief.

Treatment.—On this subject I am not prepared to venture much advice. My experiences have not been encouraging. Some cases I put on cod-liver oil and arsenic, others on the bromides ; in a third group I tried phosphorus. In all I generally prescribed rubifacients. I never succeeded in a cure. The cases without treatment seem to do as well as those treated. In malarial cases quinine improved the general health, but seemed to have no effect on the *Akatama*. The trouble is said to sometimes cease spontaneously after years of suffering.

MOSQUITOES IN RELATION TO MALARIA IN THE PROVINCE OF HUELVA, SPAIN.[1]

By Ian Macdonald, M.D.Edin., M.D.Paris.
Huelva, Spain.

The *rôle* of the mosquito called *Anopheles* in malarial infection now admits of no doubt. Since the year 1899[2] we have studied the relation and distribution of mosquitoes in reference to the prevalence of malaria in certain localities. We then found that in all malarial districts Anopheles existed in abundance, while in healthy areas only Culex could be found.

A classification we made of the different mosquitoes showed the following varieties[3] :—

Two healthy districts : C. elegans, C. phytophagus, C. pipiens, C. spathipalpis, C. penicillaris (sea-coast).

Ten malarial localities : Most of the above-mentioned mosquitoes, and in addition *Anopheles maculipennis* in all of them, and *Anopheles superpictus* in three.

Most of the malarial villages here are situated on the slope of a small hill with a ravine at its foot, which in the fever season contains small pools in the tracks of partially dried-up streams. The larvæ of Anopheles abound in these pools, which as a rule contain clear limpid water running slowly. The pools usually contain algæ, but we have found larvæ in rocky pools devoid of vegetation. Once only have we found the larvæ in an artificial collection of water—an old barrel near a house.

During winter and spring the Anopheles hibernate in stables, hen-roosts, and pigstyes, where we have always found them up to the end of May or the beginning of June ; from that time onwards it is easy to find them in the houses of the malarial villages.

With regard to the percentage of infected mosquitoes in the villages, our dissections last year gave the following results : June, 7 per cent. ; July (end) and August, 18 per cent.

Of Anopheles captured in stables, &c., none were infected.

We have infected *A. maculipennis* by feeding them on malarial blood. In staining the zygotes,[4] hæmatin has given us the best result.

Prophylaxis.—This has been carried out on a small scale with satisfactory results. Around an isolated collection of houses, twenty-one in number, the pools in these ravines were filled in or drained away. Where it was impossible to completely get rid of the water by these means narrow channels were made, by which a rapid flow was obtained and stagnation prevented. The use of nets was recommended and some families had their houses protected by wire gauze. Hen-roosts and places with domestic animals were smoked out once a week by a mixture producing sulphurous acid gas.

From May to October, 1900 (fever season), there were in this small community fourteen cases of fever ; in 1902, during the same period, one case occurred.

[1] Paper read at the Fourteenth Congress of Medicine, Madrid, 1903.

[2] *Brit. Med. Journ.*, September, 1899.

[3] Specimens of each were shown at the Congress.

[4] Microphotographs of infected stomachs were exhibited.

Note on an Embryo Filaria of the Sparrow.—While studying halteridium in the blood of the common sparrow we found several filaria embryos.[5] Dr. Manson, who kindly examined them, reported that they were blunt-tailed, unsheathed forms of *F. perstans* type. Though searching carefully all the body tissues of the bird, we were unable to find the parental forms. In the complete list of filaria quoted in Memoir 4 of the Liverpool Tropical School the sparrow does not appear among the bird hosts, so this note may be of interest.

[5] Specimens shown at the Congress.

A case of adenoids with malaria in an infant is reported by Dr. Walter F. Chappell, of New York. When five months old ten small pieces of lymphoid tissue were removed from the nasopharynx. The operation was performed owing to nasal obstruction. During the third week after the operation the child developed fever, the temperature reaching 105° F. The fever recurred at intervals during successive days, and as nothing in the throat could be found to account for the trouble, the blood was examined, when in addition to showing anæmia and leucocytosis the malaria parasite was also seen to be present. Bisulphate of quinine was administered, six grains daily by mouth, rectum, or by inunction. This dose was doubled after a few days and the patient recovered. A month after the original fever a blood examination showed polymorphonuclear leucocytosis and pigmented leucocytes, both indicative of recent malaria. The case is interesting as proving the existence of malaria in so young a child, and the amount of quinine that can be given to a child five months old. The fact that inunction of quinine, however, was practised reduced the therapeutic importance of the dosage, as we have yet to learn how far inunction of quinine is effective.

Bilious Hæmoglobinuric Fever of Malarial Origin, by A. de Villiers. *Revista Médica Cubana*, March 15th, 1903.—The author cites the frequent occurrence of hæmoglobinuria and bilious fever, accompanied by malaria. He has observed the concurrence of these diseases in numerous cases subsequent to repeated attacks of malaria. The hæmoglobinuria is usually associated with pallor, anæmia, slight increase of temperature, a rapid yet feeble pulse, and infarction of the liver and spleen. The urine in such cases on being tested exhibits albumen and biliary elements. Other cases, again, exhibit the typical symptoms of malaria. The onset is accompanied by bilious vomiting and hæmoglobinuria. As the temperature rises an icteric tint appears and the two symptoms correspond in intensity, subsiding as perspiration sets in.

In yet another group of cases the fever is continuous, the hæmoglobinuria increasing as the temperature rises, and decreasing as the fever subsides.

In every case the presence of the malaria parasite was confirmed by blood examinations.

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THE

Journal of Tropical Medicine

SEPTEMBER 1, 1903.

REMARKS ON THE REPORT OF THE ROYAL COMMISSION ON THE SOUTH AFRICAN WAR.

THE evidence given by civilian medical men before the Royal Commission on the South African War is sorry reading. One branch of the medical profession casting a slur upon the other is no doubt diverting to the public, but a regrettable circumstance to those who belong to that profession. "Those Army doctors, and you know what they are," are held up to ridicule and accused of incapacity, not by combatant officers, but by civilian surgeons who were temporarily placed in contact with them. We should like to ask who are these "Army doctors," and who are their self-constituted judges?

The medical men who join the public services we are for ever being told are of a low grade, and they are declared to be men who cannot get on in civil life, and take to the public Services as a last resource. We have no hesitation in denying this as unjust and untrue. The men who are in the higher departments of the Army Medical Service in the meantime were amongst the best whom their medical schools produced. Twenty years ago (aye, and in many instances to-day) medical schools published amongst their successes the position their alumni took in the entrance competition for the Army; and the position of the school was largely estimated by the public accordingly. From these schools not the worst but the very best men went forward to these competitions; and when men were considered fit by their teachers to compete for a position in the public Service it was considered a high compliment, if not the highest compliment that could be paid them. If the Army Medical Service has failed, and it is the fashion to say so, it is not from the fact of having incompetent medical men to guide its destinies, or if they are incompetent then is the profession in a sad plight, for they were of the very best that could be obtained. Let there be no mistake in this matter; had many of these men chosen to remain in civil life, they would have occupied high places as surgeons and physicians in our public hospitals and medical schools (and some Army men have even held such a position), and perhaps ousted some of their highly declaiming detractors from their position.

The Army Medical Service collectively represents a higher grade of professional ability than the department of civil practitioners generally. In the first place they were above the average men who attended with them at their medical school; they, whilst the civilian practitioner was commencing practice, reverted again to their studies and after competition entered the Service. A further course of excellent training was given them at Netley, and on entering the Army they were in education perhaps 40 per cent. better equipped men than their civil colleagues whom they left behind. Let this nonsense of the

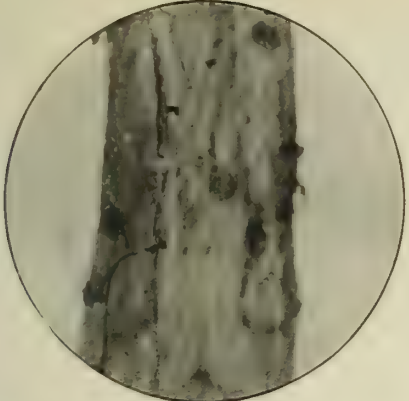

FIG. 1.—Low power. Newly infected stomach. Four zygotes visible.

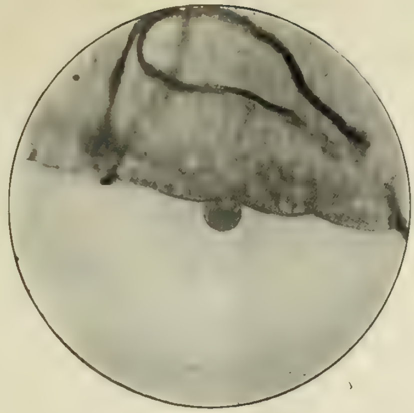

FIG. 2.—Small zygote projecting into general body cavity.

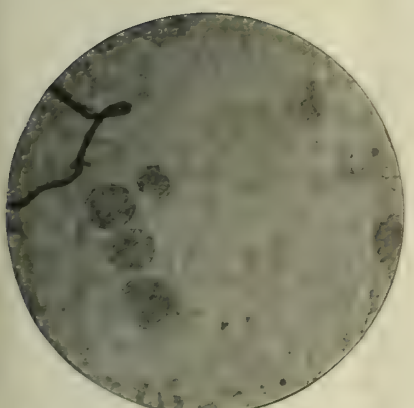

FIG. 3.—Small zygotes from stomach, fed on case with crescents.

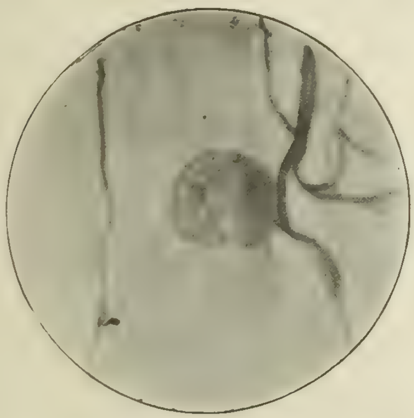

FIG. 4.—Zygote from anopheles maculipennis, caught in malarial patient's house.

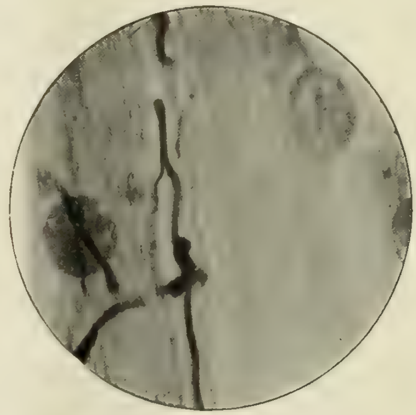

FIG. 5.—Zygotes of six to seven days (tertian case). Stained Hæmatine.

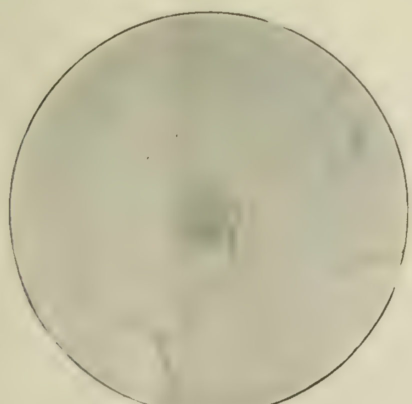

FIG. 6.—Zygote of about five days (tertian case). Stained Hæmatine.

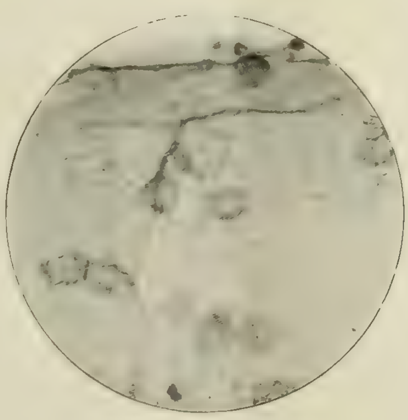

FIG. 7.—Collection of empty capsules which have burst, discharging sporozoites.

Illustrating Dr. IAN MACDONALD's Article on "Mosquitoes in Relation to Malaria."

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inferiority of medical men who enter the public Services cease; it is untrue, and the men who give utterance to these statements may be following the fashion, but it is a fashion we care not to adopt. Of course it is considered very straightforward and courageous of the civilian surgeons who went to South Africa and gave evidence before the Commission, to speak out boldly as to the professional deficiencies of their medical *confrères*. We confess to receive the straightforwardness of some of these men as something approaching to impudence. The impertinent assertion by a junior London surgeon (surgeon observe) that the Army Medical Service did not understand the treatment of enteric, but that "they do now that they have had an enormous experience, but they did not understand how even to write its name down in the slightest cases, because they called it simple continued fever, unless it had very marked symptoms; and they allowed that man with simple continued fever to go about and infect other people, and the other people so infected may have the acutest enteric," is contemptible.

Any medical man who has had experience of practice in a tropical climate will appreciate the babyish ignorance displayed in the above quotation. We have all been puzzled and will continue to be uncertain of our diagnosis of typhoid fever in the early stages, more especially in the Tropics, where so many ailments may simulate its symptoms. These, however, present no difficulty to the Assistant Surgeon of the London Hospital evidently, and if it is a question of ignorance on one hand or the other, we leave those who have had experience in the matter to decide on which side it lies.

This fashion of casting a slur upon the medical men in the Army is a very short-sighted policy from a professional point of view. In the Army the members of the medical profession are brought in contact intimately as a body with the "Army class." The whole profession is judged socially by the status of the representatives they send to the Army, and the medical profession is judged as the "Army class" find its Army representatives. It behoves the medical profession therefore, military and civil, to stand by each other, but these recent explosions by one or two self-styled judges from civilian ranks tend all the other way. Do other learned professions attack each other? Do barristers accuse each other of professional ignorance? Clergymen wrangle over doctrine, but the vulgar abuse of want of knowledge is never brought up by them or by any body of respectful men. In the medical profession, however, it is different; a civilian surgeon uses the weapon of professional ignorance to bring home his argument—a vulgar method of trying to get the better in an argument, which surely is unworthy of any member of a learned profession.

British Medical Association.

SECTION OF TROPICAL DISEASES.

Thursday, July 30th, 1903.

(*Continued from p. 262.*)

Varioloid Varicella in Trinidad.

By D. E. Dickson, M.B., C.M., and C. F. Lassalle, M.D.

In April, 1902, cases of a disease which was at first considered to be varicella, broke out in Trinidad. The disease was characterised by a period of incubation lasting from ten to fifteen days, sudden invasion, and a rash which appeared on the fourth day of the illness as papules, and generally speaking went through successive stages of vesiculation, suppuration, desiccation and desquamation. In some cases a polymorphic eruption of vesicles, pustules and crusts appeared side by side.

Twelve cases of second attacks occurred from one to seven months after complete recovery from the first attack.

It was commonly observed that a large proportion of mild cases occurred in unvaccinated people, and that many of the severe cases occurred in people who were vaccinated, and showed good marks. Attacks were also noted in the recently vaccinated.

I.—W. Briggs Clarke, M.B., Barbados, said they had experienced an outbreak of small-pox in Barbados, and simultaneously in Trinidad a disease of an undefined character appeared which presented some of the characters of small-pox, but the rash and course of the disease were so atypical that there had been considerable divergence of opinion as to whether the disease was really small-pox or not. Drs. Masson and

Bridger had both reported the outbreak to be small-pox.

II.—G. C. Low, M.B., said that he had seen these cases in Trinidad and he had no doubt they were small-pox.

Plague in Domestic Animals.

By James Cantlie, M.B., F.R.C.S.

Attention had been lately drawn to the fact that a fowl, a duck and a quail had been found suffering from plague in the Hong Kong market. The information, along with the results of the experimental feeding of animals in Hong Kong with plague material by Professor W. J. Simpson and Dr. Hunter, pointed to a very serious state of affairs. The experiments referred to proved that by feeding animals with food in which plague bacilli were present, such animals as fowls, ducks, geese, turkeys, pigeons, sheep, pigs, buffalo calves, &c., all took plague. The most interesting feature, however, of the experiments is that most of these animals may have plague upon them without any symptom of the disease. The birds' temperature may be 106° or 107°, and the pig's temperature may be 104°; and yet the animal will take its food and get about as if nothing ailed it. The infected animal sheds plague bacilli from its skin, its breath, by the urine and by the fæces, in fact from every excretory organ plague bacilli are being scattered broadcast. Seeing also that in many Eastern abodes (as in many western for that matter) the domestic animals dwell beneath the same roof, and often in the same apartment, this apartment becomes a focus of infection. In this way, no doubt, is explained the fact that plague attacks persons in one house, or in only one floor or room of a house. It also explains the persistency of plague when once it has gained hold on a district. If domestic animals so readily contract the disease (and all do), the whole environment is infected and endemicity is the result. The rat has hitherto been the only animal to which attention has been directed in the matter of plague infection; it may be, however, that the rat is of less consequence in the spread and persistency of plague than are domestic animals such as dogs, cats, fowls, &c. The destruction of rats on board ships can be of no avail if fowls, sheep, pigs, or other animals are brought on board from a plague-infected port. Plague in animals can be diagnosed only by searching for the bacillus of the disease or by taking their temperatures. As these are inapplicable on a large scale, what is wanted is some ready means of diagnosing plague in animals; in the meantime, however, such a short road to this knowledge is unknown.

In the Bitter Root Valley, Montana, U.S., "Spotted Fever" prevails in sharply limited localities, from March to July. In all cases examined there have been found evidences of bites, as if by ticks. The grey gopher of the Bitter Root Valley is considered to be the host of the hæmatozoon found in the blood of human beings suffering from the disease. Of 114 cases of spotted fever, 81 (70 per cent.) proved fatal.

Reprints.

MALARIAL REMITTENT FEVERS.

By Leonard Rogers, M.D., M.R.C.P., Captain I.M.S.

In a valuable paper entitled, "The Diagnostic Value of the Variations in the Leucocytes and other Blood Changes in Typhoid and Malarial Remittent Fevers Respectively," in the *British Medical Journal* of April 5th, 1902, Captain Rogers tabulates the blood changes, and describes the Blood Changes and differential Leucocyte count in Malarial Remittents :—

The Blood Changes in Malarial Remittents.

The table shows the blood changes in a series of cases of malarial remittent fever. The temperature at the time the blood was examined is given, as well as the highest temperature recorded within the previous twenty-four hours, so that it can be seen whether the blood was taken during the height of a paroxysm or during a remission. The result of an examination of a specimen stained by Romanowsky's method for the malarial parasite is also noted, from which it will be observed that in several cases they were not found in spite of a careful search, no doubt on account of the quinine having been given freely before the examination. Yet in these cases also the clinical features, temperature charts, progress of the disease, and other blood changes left no doubt as to their being malarial fevers. In every case negative results were obtained by Widal's test for typhoid, and in all that were tested also for Malta fever.

Degree of Anæmia.—The cases have been arranged in accordance with the degree of anæmia met with, beginning with the least and ending with the greatest. as the changes vary somewhat in the different stages, Thus in the first two cases no anæmia was present when the examination was made, and in the next four the degree is as slight as that often found in typhoid, so that in these cases no help is derived from the degree of anæmia. In the last five cases the degree of anæmia is greater than is commonly met with in typhoid, and this may not infrequently be of some diagnostic importance.

High Hæmoglobin Value or Colour Index.—Another important point is the high hæmoglobin value not infrequently met with in malarial remittents, especially in those cases which present a considerable degree of anæmia. Thus out of the last eight cases, in which this figure is entered in the table, six show a hæmoglobin value considerably above 0·7 (the normal for a native), namely, from 0·88 to 1·22, although in the typhoid cases 0·81 is the highest figure recorded. I have elsewhere pointed out that the hæmoglobin value may remain high in malaria, although during convalescence the red corpuscles may for a time be replaced quicker than the hæmoglobin, and the value may fall, and consequently values lower than normal may sometimes be met with in malarial anæmia. The low value in Case 10 may be accounted for by the patient having suffered from malarial fever for two and a half

TABLE SHOWING THE BLOOD CHANGES IN MALARIAL REMITTENTS.

No.	Nationality	Age	Sex	Temperature when blood was taken	Highest temperature previous evening	Percentage of hæmoglobin	Hæmoglobin value or colour index	Red corpuscles per cubic millimetre	White corpuscles per cubic millimetre	Ratio of white to red corpuscles	Percentage of polynuclears	Lymphocytes	Large mononuclears	Parasites found
1	H.	12	M.	103·0°	—	72	0·64	5,620,000	6,875	1- 817	68·2	15·6	16·0	*Nil.*
2	E.	17	M.	98·4	98·4°	80	0·79	5,040,000	5,375	1- 937	50·4	33·0	16·4	*Nil.*
3	E. I.	32	F.	103·0	103·4°	—	—	4,410,000	5,250	1- 840	69 0	11·4	19·2	M. T.
3a	H.	30	M.	99·6	101·4°	56	0 72	3,910,000	8,250	1- 433	66·0	19·2	14·8	*Nil.*
4	H.	45	M.	100·8	104·0°	68	0·89	3,835,000	4,500	1- 852	55·4	36·6	8·0	*Nil.*
				97·0	99·0°	65	0·71	4,560,000	5,125	1- 899	66·4	18·6	14·8	
5	M.	22	M.	100·6	104·0°	50	0·65	3,825,000	1,275	1-3000	28·6	62·4	13·6	M. T.
6	M.	21	M.	103·6°	103·6°	53	0·71	3,745,000	3,875	1- 976	35·2	44·0	23·8	M. T.
				98·6	100·0°	51	0·81	3,160,000	5,250	1- 602	45·4	27·0	27·4	
7	M.	25	M.	105·4	105·4°	50	0·97	2,565,000	750	1-3430	66·0	25·8	7·4	M. T.
				*	*	60	0·73	3,430,000	1,625	1-2111	54·5	25·0	19·6	
8	H.	30	M.	†	†	75	1·15	3,250,000	4,500	1- 722	67·6	20 6	11·8	*Nil.*
9	H.	60	M.	101·6	102·6°	54	0 97	2,790,000	750	1-3720	53·5	40·5	5·0	M. T.
				‡	‡	55	0·98	2,830,000	1,000	1-2830	59·5	11·0	29·0	
0	N. Ch.	11	F.	98·0	101·0°	24	0·56	2,165,000	1,000	1-2165	39·0	42·0	20·0	*Nil.*
				104·0	103·0°	22	0·51	2,165,000	1,000	1-2165	48·5	39·0	11·5	
1	H.	24	M.	100·6	103·0°	38	0·88	2,150,000	2,000	1-1075	26·4	61·4	11·6	M. T.
2	N. Ch.	33	M.	100·4	103·8°	39	0·99	1,960,000	3,500	1- 560	48·8	38·2	12·6	*Nil.*
3	H.	35	F.	—	—	—	—	—	—	-	34·4	46·4	18·8	*Nil.*
4	H.	28	M.	98·2	103·6°	47	1·22	1,925,000	1,500	1-1283	39·0	48·2	12·2	—

* Normal 3 days. † Normal 5 days. ‡ Normal 1 day.

ıonths a year before the attack during which the lood count was made, at the beginning of which she ıowed a chronic enlargement of the spleen and anæmia ue to the previous malaria. The hæmoglobin value ı malarial cases, then, may vary from a few points elow the normal to as many above it, in which respect ıe disease differs from typhoid with its nearly normal gures. The values above the normal are, I think, most diagnostic value.

The Total Leucocyte Count.—In malarial remittents ith little or no anæmia the total leucocyte count ows only a slight reduction as in typhoid, and is nsequently of no help in differentiating the two seases. On the other hand, in those malarial cases th marked anæmia the total count of white corpus- s is nearly always lower than is commonly met with typhoid. Counts of below 2,000 per c.mm. are in vour of a diagnosis of malarial as against typhoid er, while, when only 1,000 or fewer are found, the e has always proved to be malarial in my expe- nce. Further, if the proportion of white to red falls ow 1 to 2,000, the case is nearly always malarial, the patient has also suffered fairly recently from t disease to a marked degree.

Parasites.—In every case in which parasites were nd they were of the malignant tertian variety, which he usual form met with in malarial remittents in cutta. The cases in which none could be found been treated with quinine before they were exam- l by me.

THE DIFFERENTIAL LEUCOCYTE COUNT IN MALARIAL REMITTENTS.

ı the table the percentages of the different forms leucocytes in a series of cases of malarial remit- s are recorded, the data being arrived at in pre- y the same way as in the typhoid cases, many of counts having, indeed, been made before either the m test or search for malarial parasites had been carried out, with the result that whenever a well-marked lymphocyte increase without any excess of large mononuclears was found, the case proved to be one of typhoid, while whenever a well-marked large mononuclear increase was met with a diagnosis of malaria was correctly indicated. The exact changes, however, depend largely on the degree of temperature and stage of the fever paroxysm when the blood is taken, as well as on the acuteness or chronicity of the case, the degree of anæmia present, and whether the total leucocyte count is slightly or greatly below the normal, so that the figures present a much less degree of uniformity than do those of the typhoid table. It will therefore be most convenient to begin with the most constant and important change.

The Increased Percentage of Large Mononuclears.—Every case in the table shows a considerable increase of the large mononuclear corpuscles in some stage of the fever, this increase being most marked during the remissions of the fever or shortly after the temperature has fallen to normal, as already pointed out by Stephens and Christophers. In the present series the percentage varied from 11·5 to 29. As a rule, this increase is such a noticeable feature that it can be detected after some practice by a very short inspection of a stained slide with an ordinary high power. It is worthy of note that in Cases 7 and 9, when there was no increase of the large mononuclears during the first examination when the temperature was high, there were other features in the blood changes which served to exclude typhoid and to strongly indicate the presence of malarial fever. Not only was there a marked degree of anæmia, but the total leucocyte count was below 1,000 per cubic millimetre, and the proportion of white to red corpuscles less than 1 to 3,000, these being figures which we have already seen are very rarely, if ever, met with in typhoid fever, although not very uncommon in malarial fever of long duration. Just then in those cases where the increase of the large mononuclears

fails, other changes which are of diagnostic value are present, while in the cases which present little anæmia (so that the other blood changes are similar to those which obtain in typhoid) the large mononuclear increase is most marked. The low figure of 8 per cent. at the first count in Case 4 is an exception to this rule. Stephens and Christophers consider that the presence of 15 per cent. or more of large mononuclears is diagnostic of malarial fever, in which opinion I concur, only with the method of counting mentioned above I think the limit might be fixed even lower, such as at about 12 per cent. In the absence of parasites, due generally to previous dosage with quinine, this large mononuclear increase is of the greatest diagnostic value, and can be easily and quickly ascertained from a stained slide.

Presence ot Myelocytes.—Another point which has attracted my attention in the present research is the frequency of the occurrence in malarial fevers of very large mononuclear corpuscles with a darkly-stained nucleus and deep blue - stained protoplasm with Romanowsky's stain, which appear to be myelocytes. That myelocytes are often present in marked anæmia of malarial origin is mentioned by Cabot, the highest count found by him being 3 per cent. In the tables they are included with the large mononuclear corpuscles, as unfortunately it is only in the most recent cases that they were counted separately, but in the second count in Case No. 6 they formed no less than 5·4 per cent. of the white corpuscles, and in several others from 1 to 3 per cent. of them have been met with. On the other hand, in typhoid an occasional myelocyte has only very rarely been met with in a count of 500 corpuscles. These bodies are so striking that when 2 or 3 per cent. are present they are easily detected on examining a stained slide, and as far as my experience yet goes their presence in these numbers during a continued fever is diagnostic of a malarial remittent, while they may occur in cases with no very marked degree of anæmia. For example, in Case No. 3*a*, with nearly four million red corpuscles, 2·4 per cent. of them were found. If these observations are confirmed by further experience, the presence of myelocytes in any numbers will prove to be of considerable diagnostic value in malarial remittents.

Decrease of Polynuclears and Increase of Lymphocytes.—Lastly, we have to deal with the changes in the proportion of the other leucocytes, namely, the decrease in the polynuclears and a proportionate increase in the lymphocytes. This change is met with in a very variable degree, being most marked as a rule in those cases which present a high degree of anæmia, and least marked or entirely absent in those with little or no anæmia, as illustrated by the first four cases in the table. The increase of the lymphocytes is also most marked in those cases in which the total leucocyte count is lowest, as illustrated by the latter part of the table; but it is just in these that the high degree of anæmia and great proportional decrease in the total number of leucocytes excludes uncomplicated typhoid fever, while the increased percentage of large mononuclears will still be present if malarial fever persists or has only ceased within a few days. On the other hand, I have found a marked increase in the lymphocytes without any excess of large mononuclears in some cases of greatly enlarged spleen, due to malarial cachexia in which no recent fever of a malarious nature has occurred, but these could not possibly be confused with typhoid fever. The extreme decrease of the polynuclears to below 40 per cent. shown in several of the cases in Table 2 I have only yet met with in chronic malarial fevers.

Leucocytosis.—Although there may be a relative increase in the leucocytes at certain stages of a malarial paroxysm, true leucocytosis very rarely occurs in malaria, not even when it is complicated by bronchopneumonia, in several cases of which disease I have found a very low leucocyte count in malarial subjects. The presence of marked leucocytosis in cases of intermittent and remittent fevers is, then, of great value in excluding malaria and uncomplicated typhoid fever, and pointing to some form of local inflammation, the most important of which, in my experience, in India is liver abscess. On three occasions within the last few months I have found a very high degree of leucocytosis, from 30,000 to 40,000 white corpuscles per cubic millimetre, in cases which were being treated for malaria, and in each case the suspicion of the fever being due to liver abscess thus aroused proved to be correct. Moreover, I have found that the presence of leucocytosis can be detected by a short examination of a stained blood slide, for from twenty to forty white corpuscles may be seen at once in the fields of an ordinary high power all along at the edge of the smear, about 90 per cent. of which will be polynuclears, a condition never met with when the white corpuscles are not increased in numbers, and one which may be taken as evidence of leucocytosis without the necessity of counting the white corpuscles with a hæmocytometer.

Conclusions.

(1) The percentage of the different forms of leucocytes counted in a stained blood film is of great diagnostic value in differentiating typhoid and malarial remittent fevers, and is easily ascertained.

(2) An increase of the lymphocytes to 40 per cent. or over, without any increase in the large mononuclears, points to typhoid as against malarial fever.

(3) An increase in the large mononuclears to about 12 per cent. and upwards, especially during the remissions of the temperature, strongly indicates malaria as against typhoid fever. This change is of great value when parasites are absent from the blood.

(4) The presence of myelocytes in any number, such as from 1 to 5 per cent., points to malaria as against typhoid fever.

(5) A high degree of anæmia, such as a reduction of the red corpuscles to below 3,000,000 per c.mm., is much more frequently met with in malarial than in typhoid fever.

(6) A very great reduction in the total leucocyte count, such as to below 2,000 per c.mm., is much more frequently met with in malarial than in typhoid fever, while the proportion of white to red corpuscles in malaria is not infrequently less than 1 to 2,000, which is rare in typhoid fever.

(7) Leucocytosis can be detected by the presence of a great excess of white corpuscles, upwards of 80 per cent. of which are polynuclears, in a stained blood film, and is often of service in excluding malaria in intermittent fever due to liver abscess or other local inflammation.

In a paper read before the Medical Chirurgical Society on May 12th, 1903, Captain Rogers further discusses the subject of Malarial Remittent Fevers.

Malarial Remittent Fevers.

The differentiation of malarial remittent fevers from typhoid in their earlier stages is, in many instances, one of the most difficult problems in tropical medicine. In the first place we must define the term "remittent," and draw some line between it and intermittent cases; for these terms are often very loosely used, different meaning being attached to them by various observers. For instance, in many cases of malignant tertian malarial fever the temperature remains high for some thirty-six hours, and then falls to about normal for a few hours before the same cycle is repeated. This is essentially an intermittent type, and the term remittent should be reserved for those cases in which the temperature remains well above the normal line for some days. I have adopted the plan of classing cases under the head of "remittent fever" only when the temperature did not fall below 100° F. for two or more clear days; and the following data are also based on a series of cases complying with this definition. I find in my tables twenty-nine acute malarial remittents, which both the clinical course and the result of the exhibition of quinine clearly proved to be malarial. Further, they were all examined by the serum test for both typhoid and Malta fever, with negative results in all but one man, who had suffered from a severe attack of typhoid fever in South Africa two years before, and whose blood gave a reaction in a dilution of 1 in 40. All these cases had been liberally dosed with quinine before I had an opportunity of examining their blood, so that the fact that in only a small proportion of them were malarial parasites found in no way negatives their malarial nature. Moreover, as we shall see presently, nearly all of them showed the typical large mononuclear increase of malaria, which fortunately is not masked by quinine, and hence has a peculiar diagnostic value in such a series as this. By analysing them in a similar manner to the former series of typhoid cases, we shall be able to get a clear idea of the diagnostic value in the two fevers of the blood changes; and if these are found to afford sufficient ground for believing that the two diseases have been separated with a considerable degree of accuracy, then a comparison of the course and symptoms in the two series may be expected to furnish us with some useful date for their clinical diagnosis. They may be conveniently considered in the same order as in the typhoids.

The qualifying term "acute" malarial remittents is used above in order to exclude cases of chronic malarial fever—best designated by the valuable old, but comprehensive term, malarial cachexia, for in these also the remittent type of fever occurs now and then interspersed in the generally intermittent course of the disease. As I have recently demonstrated (*Indian Medical Gazette*, November, 1902), there are certain special blood changes of great importance found in such cases—namely, an extreme reduction in the total number of the white corpuscles, accompanied by a great relative reduction in the polynuclears, with a corresponding increase in the percentage of the lymphocytes as well as the typical increase of the large mononuclears of acute malaria if marked fever is present. These changes are of great prognostic value, and I have suggested that they may explain the great resistance of such cases to ordinary doses of quinine, and also the success I have recently had with very large ones by the mouth or the hypodermic use of the drug in chronic malaria.

Age-incidence.—No diagnostic import attaches to the ages of the patients in the case of these two fevers.

The Duration of the Fever.—This is of much greater importance, for typhoid very rarely runs a course of much under three weeks. In the following table the total duration of the fever both before and after admission is given in the first line, and the time the fever lasted under treatment in the hospital, where quinine was always given in smaller or larger doses, is shown in the second line.

Table of Duration of Fever.

Duration of fever in days	1-7	8-14	15-20	21-25	26-30	31-40	Over 40
Total duration	3	8	8	2	4	1	3
Fever in hospital	12	11	3	2	1	—	—

Here we see a marked difference from typhoid fever, the duration of which exceeded twenty days in four-fifths of the cases, and in only 4 per cent. ended within two weeks. Still more marked is the difference in the duration of the fever after coming under treatment, for the majority of the typhoid cases were admitted during the first week of the disease, and therefore had two weeks or more fever in hospital; while in the case of the malarial remittents under treatment with quinine, almost four-fifths came to an end within fourteen days of admission, and over one-third within one week. This is in agreement with the conclusion I came to over a year ago (*Indian Medical Gazette*, January, 1902) with regard to continued and remittent fevers in natives (excluding cases of malarial cachexia)—namely, that upwards of 80 per cent. of such fevers which lasted three weeks or more were typhoid fever.

Clinical Characters.—The chief points in which acute malarial remittents differ from typhoid are mainly of a negative character. Thus in the former, diarrhœa, abdominal distension and pain, rose-spots, and bronchial catarrh are absent or rarely met with. Hæmorrhage from the bowel is very rare, except when dysentery complicates the disease. On the other hand, the spleen is much more frequently and markedly enlarged in the malarial remittents, and the liver is also frequently to be felt below the ribs. A history of chill or rigors or fever on and off for some time previously is in favour of a diagnosis of malarial remittent fever, but it is also

not very rarely obtained in cases of typhoid in the Tropics, so cannot be relied on very much.

The Temperature Curve.—This is of great importance, for although the remittent type is commonly seen in typhoid, yet the rises and falls are as a rule much more regular and punctual to the hour in malarial remittents, and also usually of greater amplitude. When the rises occur regularly at some other period of the twenty-four hours than the afternoon or early evening, the case is nearly certain to be malarial. Of even greater value is the fact that in all my charts I can only find one malarial remittent fever in which the temperature remained within two degrees for upwards of forty-eight hours, and at a height of above 101° F., unless there was some complication such as pneumonia. Every other case in which this continued type of a high degree was present proved to be enteric fever and not malarial. Of course a similar type is common in pneumonia, but here the presence of leucocytosis will exclude uncomplicated typhoid. As this continued type is most frequently seen during the first and second week of typhoid it is of very great diagnostic value, and has frequently enabled me to correctly diagnose typhoid fever in an early stage of the disease, before other definite symptoms were present; and I look on the establishment of this point, by means of my study of a large number of four-hour charts of continued and remittent fevers controlled by serum and blood tests, as a most important practical outcome of this investigation. The contrary, of course, does not hold good, for, as we have seen, the curve in true typhoid may be remittent, or even rarely intermittent, and may also occasionally show as great regularity of the remissions as in malarial cases. There remain, then, a number of cases in which the temperature curve will not be of any material service, and it is in these that the serum tests and leucocyte counts are of such great value.

The Pulse-rate.—It is a well-known feature of typhoid fever that the pulse may remain below 100 per minute persistently for days when the temperature is raised to 103° or 104° F., especially in cases which are running a favourable course. A large proportion of my cases have shown this point in a well-marked degree. On the other hand, I can only find one chart, out of a number in which the pulse-rate was recorded, in which it remained persistently below 100 per minute in malarial remittent fevers, and this was a very mild one in which the temperature never rose above 101·2°. This slow pulse-rate when present is a valuable point in favour of typhoid as against malarial remittent fever, while it is most frequently seen in the mild cases, which are most difficult to diagnose by purely clinical means.

The Malarial Parasites.—As already mentioned, all the cases here dealt with had been saturated with quinine for some days before I was able to examine them, so that the parasites were seldom found in the single slide made on the one or, rarely, two occasions when the blood was tested. When present they were always of the malignant tertian variety, but out of the twenty-nine cases referred to above, in only six of them, or 20·7 per cent., were they detected, Romanowsky's stain being always used. This agrees closely with Captain Delany's results in the Medical College Hospital, Calcutta, under very similar circumstances (*British Medical Journal*, March 28th, 1903). In two cases, however, the temperature had finally reached normal before they were examined, and in three more it was on its final fall. If these are excluded as extremely unlikely to show parasites, then they were found in 25 per cent. of the remaining cases.

The serum reaction, as already mentioned, was negative, except in one man, who had typhoid fever two years before. That for Malta fever was also negative, except that in one or two cases a clumping in a dilution of only 1 in 10 occurred, as happens occasionally, in my experience, in normal bloods and in those of persons suffering from various diseases other than Malta fever.

The Large Mononuclear Increase in Malarial Remittents.—The following table shows the percentage of large mononuclears found in thirty-four examinations of the blood, arranged in the same way as that already given for typhoid cases, except that they are classed in accordance with the temperature when the film was taken instead of the week of the disease—the former having an important influence, for, as shown by Drs. Christophers and Stephens (*Report of the Malaria Commission of the Royal Society*), the large mononuclear increase becomes less marked as the temperature rises.

TABLE OF LARGE MONONUCLEAR INCREASE IN MALARIAL REMITTENT FEVERS.

	Normal or slightly increased, 4.			Markedly increased, 30.			Total.
Percentages	-4	4-8	8-11	11-15	15-20	Over 20	
Temp. — 101° F.	0	2	1	7	7	4	21
Temp. + 101° F.	0	1	0	8	3	1	13
Total	0	3	1	15	10	5	34

We see from this table that in only four out of thirty-four examinations were the large mononuclears less than 11 per cent., and in one of these they were increased over that number at a second examination when the temperature had fallen to normal. This is just the reverse of what we found to be the case in typhoid, in only two cases of which during the first three weeks of the disease were over 11 per cent. large mononuclears found, and these were complicated by malaria; so that by the leucocyte count alone the two forms of remittent fever can almost invariably be differentiated. It will also be observed that the highest percentages of large mononuclears are met with in examinations made when the temperature is below 101°, as compared with those made when it is above that point, which is in accordance with the observations of other workers on malaria, as mentioned above.

TABLE OF THE LYMPHOCYTES IN MALARIAL REMITTENT FEVERS.

	Normal, 23.			Increased 11.				Total.
Percentages	-20	20-25	25-30	30-35	35-40	40-50	50	
Number of examinations	7	8	8	4	3	3	1	34

From this table we see that more than two-thirds of the cases showed no increase of the lymphocytes, while a marked increase was quite exceptional, instead of being the rule, as in typhoid. These two points taken together are of very great value in the differential dia-

nosis of the two fevers, and will very rarely indeed nislead, if the precaution is taken of examining the lood in the morning during a remission of the fever n cases suspected to be malarial, for it is at this time hat the increase of the large mononuclears is best narked.

The Quinine Test.—Before leaving the subject of the nalarial remittent fevers we must discuss how far the iagnosis of malarial remittents made by means of the ifferential leucocyte counts has been borne out by the esults of subsequent antimalarial treatment, for unless hey will stand this test in patients not yet the subject f marked malarial cachexia they cannot be relied on. Now in several of these cases the patients had been aking quinine in 10-grain doses three times a day by he mouth for a week or more, with little or no effect on he temperature curve; and this would be held by some o be sufficient to prove that they were not of a malarial ature. This opinion may be true of malaria in some ountries, but it is utterly untrue of many cases of nalaria as seen in Lower Bengal and other parts of ndia—a point on which I cannot lay too much stress, s this fallacy has been responsible for much lingering ever and many deaths. During the last fever season t the Calcutta General Hospital, as soon as a large nononuclear increase has been found in cases which ave resisted quinine by the mouth, the drug has been iven hypodermically in from 5 to 10-grain doses twice day, the bi-hydrochlorate being used, and injected nto the subcutaneous tissues. The results have been dmirable, for case after case has fallen to normal in wo or three days. The leucocyte count, then, has ome triumphantly out of the ordeal of the quinine est, although in most of these cases no parasites could e found in the peripheral circulation, and fortunately o opportunity of finding them after death has occurred, lthough a few years back *post mortems* were not very re in this class of cases, especially when quinine was rdered to be only given when the temperature was elow a certain point, with the result that the drug as reduced in direct proportion to the severity of e case, instead of being increased.

THE CONDITION OF THE BLOOD IN FILARIASIS.

By G. Lovell Gulland, M.A., B.Sc., M.D., F.R.C.P.E.
sistant Physician to the Royal Infirmary, Edinburgh, &c.

About two years ago Mr. D., a Eurasian student, nsulted Dr. Charles Kennedy of this city with regard a swelling of the left inguinal glands, which was giving n a good deal of pain and discomfort. All the ordiry causes of bubo could with certainty be excluded, d, as the swelling was increasing in size, the patient nsented to have the glands excised by Mr. H. J. Stiles. hile the operation was being performed a quantity chylous fluid escaped, and this at once determined true nature of the case. Some of the fluid was llected and sent to me for examination. I could find filariæ, but it was obvious that the fluid was chyle, l it was resolved to examine the blood in the evening. This was done, and numerous filariæ were found. I may remark here that the wound healed by first intention without any further escape of chyle.

In examining stained films of the blood I was struck by the large number of leucocytes in the films, and especially by the high percentage of eosinophiles present. This led me to make a differential count of the leucocytes (films taken on November 28th, 9.20 p.m.), when I found the percentages in 500 cells to be as follows:—

Polymorphonuclears	63·5
Lymphocytes	28·5
Eosinophiles	8·0
	100·0

As the normal percentage of eosinophiles in the blood is 1-4, this constituted a distinct eosinophilia, and I determined to examine the blood more thoroughly and at different hours of the day, in order to see whether there was any relationship between the eosinophilia and the presence of the embryos in the blood, and whether there was or was not a leucocytosis in addition. On December 1st, at 4 p.m., when there were very few embryos in the blood, the leucocytes were 6,800; at 11 p.m., when they were numerous, the leucocytes were 12,500. The percentage of eosinophiles rose from seven at 4 p.m. to twelve at 11 p.m. On December 12th, at 10.15 a.m., when no filariæ could be found, the leucocytes numbered 4,600, with 6 per cent. of eosinophiles; at 11.30 p.m., with many filariæ, the leucocytes were 13,100, the eosinophiles 9·5 per cent. On January 31st, at 10 am. (no filariæ), the leucocytes were 5,000, the eosinophiles 3 per cent.; at 3 p.m. (no filariæ), leucocytes 6,300, eosinophiles 4·5 per cent.; at 10.20 p.m. (numerous filariæ), leucocytes 10,100, eosinophiles 8 per cent. On February 8th, at 10.10 p.m. (many filariæ), the leucocytes were 10,600, eosinophiles 7 per cent.

During this time Mr. D. was in perfect health; indeed, more observations would have been made had it not been that he was attending classes at the University, and as he lived at the other side of the town, and I was very busy at the time, it was very difficult to make arrangements for meeting. The evening leucocytosis could not have been due to digestion, for he took his principal meal at 1 p.m., and the evening meal was a light one.

Table of Percentages of different Varieties of Leucocytes in Blood in Filariasis.

—	Nov. 28th, 9.20 p.m.	Dec. 1st, 4 p.m.	Dec. 1st, 11.10 p.m.	Dec. 12th, 10.15 a.m.	Dec. 12th, 11.30 p.m.	Jan. 31st, 10 a.m.	Jan. 31st, 3 p.m.	Jan. 31st, 10.20 p.m.	Feb. 8th, 10.10 p.m.
Polymorphonuclears	63·5	68·5	55·5	57·5	59·0	65·0	66·0	61·0	67·0
Lymphocytes	28·5	24·5	32·5	36·5	31·5	32·0	29·5	31·0	26·0
Eosinophiles	8·0	7·0	12·0	6·0	9·5	3·0	4·5	8·0	7·0

I have tabulated the whole of the differential counts, which were of 500 cells in each case, for it is to be noted

that in addition to the evening eosinophilia, there was a constant high proportion of lymphocytes, which did not show much variation throughout. This may have been an individual peculiarity, but there are many conditions in which eosinophilia and lymphocytosis are associated. In contrast to this is the low proportion of the polymorphonuclears, which never reached the normal minimum percentage of 70. The relation between lymphocytes and polymorphonuclears remained fairly constant, and of course both varieties must have been increased absolutely in order to produce the high evening counts of leucocytes. The increase of eosinophiles is brought out better if, instead of taking the percentages, the total number present in the cubic millimetre is calculated. We then find—

Between 10 a.m. and 11 a.m. ..	276 and 150
at 3 p.m. ..	283
,, 4 ,, ..	476
,, 10.10 ,, ..	742
,, 10.20 ,, ..	808
,, 11.10 ,, ..	1,500
,, 11.20 ,, ..	1,244

The red corpuscles showed no abnormality in number or otherwise during the observations. These were brought to a close by the patient's return to India soon after the last date.

I was unwilling to publish an isolated observation, and have been in hopes of being able to examine other cases in the same way, but have had no opportunity of doing so. I therefore read a note of the case at the November meeting of the Edinburgh Pathological Club last year. The attention of workers in countries where filariæ are found seems to have been directed entirely to the embryos, and no observations similar to the above have been published until January of this year, when, in the *Johns Hopkins Hospital Bulletin*, Dr. Calvert gives a preliminary note on two cases of filariasis in Filipino prisoners. In both of these he found leucocytosis and eosinophilia, and in both, also, the lymphocyte percentage was fairly high in the two differential counts which he gives, though not so high as in my case. He seems, however, to have made no attempt to ascertain whether there was any association between the time of day when the blood was examined, or, in other words, the number of filariæ present in the blood and the amount of leucocytosis and eosinophilia. It seems to me that that is the most interesting point in my case, that the percentage of eosinophiles rose steadily from a normal figure in the early morning, when no filariæ could be found (though, of course, a few may have been present) to high figures just before midnight, when the number of embryos in the blood was at its highest point.

These observations, incomplete as they necessarily have been, bring filariasis into line with several other parasitic infections. It has long been known that several intestinal parasites—ascaris, oxyuris, ankylostoma, and tænia—produce eosinophilia, though not in every case, while Cabot and Brown have recently shown that very extreme eosinophilia may be produced in trichiniasis, though here again different cases differ in the amount of reaction produced. I may note also that in some observations I made some time ago on the intestines of salmon and trout, I found that where intestinal parasites were present, and they were rarely absent, the walls of the intestine were packed with eosinophile leucocytes.

All these facts go to prove that the eosinophiles are concerned in protecting the body from the toxins of parasites, whether these are absorbed from the intestine or are actually elaborated in the blood. That the other varieties of leucocytes have also to do with this would seem to be indicated by the general leucocytosis which I have described as concurrent with the increase of filariæ, but observations are wanting as to whether other parasites produce a leucocytosis of this kind.

Note.—Since the above lines were sent to the Editor I have seen another case, with Mr. J. M. Cotterill, of varicose inguinal glands from filariasis. The condition was of four years' standing. As yet I have only made one examination of the blood, at 9.30 p.m. Very few filariæ were present: the leucocytes were not increased in absolute number, but there was distinct eosinophilia and also a high lymphocyte percentage—polymorphonuclears 52·5, lymphocytes 40·5, eosinophiles 7. I am glad to have had this confirmatory observation, and hope to publish full details of the case later.

HONG KONG.

Report of the Principal Civil Medical Officer for the Year 1902.

The report just issued is quite up to the standard of recent reports upon the work of the Civil Medical Department of Hong Kong. In no Colony is the report of the medical work better done than in Hong Kong, and we congratulate the able and efficient medical staff of the department, not only upon the report itself but also upon the amount and excellence of the work they have accomplished.

Malaria.—We are aware that active steps were being taken in Hong Kong against malaria and we were anxious to have the results officially before us. We proceed no further than page 2 of the report to find a positive statement in regard to this subject. In discussing the admissions amongst the police (strength 881) Dr. Atkinson reports: "There was a marked diminution in the number of malarial fever admissions, the figures being 176 as against 407 in 1901, a result due, in a great measure, to the more active anti-malarial measures carried on, and to the more regular use of quinine as a prophylactic.

In the "new territory" on the mainland the effects of these measures are still better marked, there being but 11 cases of malaria against 52 during the year 1901, the number of police amounting to 99 in 1901 and 94 in 1902.

Taking the general admissions to the Civil Hospital, the report states that there was a decided decrease in the number of malarial fever patients admitted, the figures being 349 compared with 787 in 1901.

Dengue has proved the most widely spread epidemic

during the year 1901, no fewer than 422 cases having been admitted to the Hospital. The first case occurred on June 28th, 1901; 90 cases were admitted during July; 241 in August; 56 in September, and 33 in October. The outbreak subsided with the onset of cold weather, only 2 cases being admitted in November. Dengue is very infectious evidently, almost all the members of the nursing and medical staff contracting the disease; on the other hand, dengue cannot be said to be contagious, as many of the attendants were seized only after two months' attendance upon dengue patients.

Plague.—During the year 1902 there were admitted to the plague hospital 94 cases of plague, 80 of whom died. The anti-plague serum received monthly from Paris is stated to have proved useless, believed to be due to the deterioration during transit from Paris. It is intended to prepare the serum locally.

The Chinese and Western Medical Treatment.—Dr. J. C. Thomson, to whom is mainly due the smooth working of the native Chinese Hospital—the Tung Wah—where Chinese and British modes of treatment are carried on side by side, reports on the working of the institution as follows:—

There is, moreover, a marked tendency to improvement in the work of the Tung Wah Hospital which cannot be expressed in figures. All cases diagnosed as malaria are required to take quinine, whether under European or Chinese treatment. By a recent resolution of the Directors, all cases of infectious disease go under European methods of treatment, and are hence more under the control of the Inspecting Medical Officer; the violent jealousy that previously existed against the introduction of European methods, especially among the native doctors, has to a large extent subsided, and they are frequently ready to be advised by the European-trained house surgeon, who thus influences the treatment of many cases of fracture, dislocation, abscess, &c., which remain nominally under Chinese treatment; and many matters pertaining to the regular changing of bedding, clothing, &c., formerly secured only by continuous effort and watchfulness, have now become routine practice.

PLAGUE DURING THE SIX MONTHS ENDING JUNE 30, 1903.

During the six months ending June 23rd, 1903, the report of plague in several of the most important centres of the disease will be found below. Although during the past few years the area of plague infection has not materially increased, the persistent endemicity of the disease is most marked. The reason of this has been explained by Professor W. J. Simpson and Dr. W. Hunter in their report on the infection of domestic animals gathered from experimental researches in Hong Kong. Attention has been so concentrated upon the rat as being the one animal liable to plague, that the possibility of other animals, especially fowls, pigs, cats, &c., being afflicted with the disease has been wholly overlooked, at any rate from an etiological point of view. Now that our attention has been directed to the matter by Drs. Simpson and Hunter, the endemicity and persistency of plague are more readily understandable.

In India, the returns for the six months from January 1st to June 30th, 1903, show a plague epidemic of unprecedented virulence. Over half a million persons died of plague in India according to *official* records. During the remaining six months of the year we know from experience that the epidemic will well nigh disappear from India. Yet we have but little hope that the "plague season" of 1904 will not return with something of its usual virulence.

In South Africa plague has never proved severe, but in several towns it has continued with extraordinary persistency. With the exception of some thirty deaths in Durban, Natal, there has been no plague in South Africa outside Cape Colony during 1903. The towns in which the disease has been recorded are: Port Elizabeth, King William's Town, East London, and in a lesser degree, Queenstown, Graaff-Reinet, and, Burghersdorp.

In *Hong Kong* plague has existed since 1894, and with the exception of 1895 and 1902 the outbreaks have been severe. During the first six months of 1903 the cases recorded number just over 1,200.

In *Mauritius* plague disappeared for a time, and although it recurred the disease has not attained the virulence formerly recorded.

Plague has been recorded in Manila, at Suez, in Chili; but with the exception of Manila the outbreaks have been quite limited.

India.

The total deaths from plague in India during the six months ending June 30th, 1903, amounted to 533,565. The weekly records of deaths being as follows:

January	1—3	6,783
,,	10	16,197
,,	17	19,224
,,	24	22,954
,,	31	24,500
February	7	25,780
,,	14	25,852
,,	21	27,319
,,	28	28,860
March	7	29,647
,,	14	29,997
,,	21	29,236
,,	28	32,078
April	4	34,000
,,	11	27,787
,,	18	32,159
,,	25	28,146
May	2	24,333
,,	9	20,246
,,	16	15,400
,,	23	10,573
,,	30	8,678
June	6	6,014
,,	13	3,707
,,	20	2,084
,,	27	1,362
,,	28—30	669
Total		533,565

Cape Colony.

The total deaths from plague in Cape Colony during the six months ending June 30th, 1903, amounted to 117. The weekly records of deaths being as follows :—

January	3	0
,,	10	0
,,	17	0
,,	24	0
,,	31	2
February	7	1
,,	14	0
,,	21	2
March	7	7
,,	14	1
,,	21	6
,,	28	6
April	4	4
,,	11	16
,,	18	17
,,	25	9
May	2	6
,,	9	7
,,	16	4
,,	23	4
,,	30	3
June	6	7
,,	13	4
,,	20	2
,,	27	3
,,	28—30	2
	Total	117
	Natal (1903)	30
	Total for South Africa	147

Mauritius.

The total deaths from plague in Mauritius during the six months ending June 30th, 1903, amounted to 47. The weekly record of deaths being as follows :—

January	8	4
,,	15	4
,,	22	4
,,	29	5
February	5	4
,,	12	1
,,	19	1
,,	26	1
March	5	2
,,	12	2
,,	19	1
,,	26	0
April	2	0
,,	9	0
,,	16	0
,,	23	1
,,	30	1
May	7	1
,,	14	1
,,	21	2
,,	28	1
June	4	1
June	11	2
,,	18	2
,,	25	4
,,	30	2
	Total	47

Hong Kong.

The total deaths from plague in Hong Kong during the six months ending June 30th, 1903, amounted to 1,036. The weekly records of deaths being as follows :—

January 1 to February 7		12
,,	14	2
,,	21	3
,,	28	12
March	7	17
,,	14	17
,,	21	8
,,	28	16
April	4	59
,,	11	22
,,	18	47
,,	25	72
May	2	83
,,	9	85
,,	16	99
,,	23	123
,,	30	103
June	6	94
,,	13	78
,,	20	60
,,	27	35
,,	28—30	9
	Total	1,036

Review.

POLYPHASE CURRENTS IN ELECTROTHERAPY. By George Herschell, M.D.(Lond.). Glaisher, Wigmore Street, Cavendish Square, London. Pp. 44. 1903. Price 2s. 6d.

The subject of electrotherapeutics continues to grow in bulk and to advance in complexity. The medical practitioner who learned his profession twenty years ago is hopelessly at fault if he has not mastered the elements of such subjects as high frequency currents, light-treatment, X-ray work, and a host of other technicalities which have sprung up within the last decade. To follow them all to an ultimate understanding is an impossibility for one engaged in practice, but nevertheless it is possible to get a good clinically useful knowledge of the subjects by a little attention. Although the paper published by Dr. Herschell deals especially with the application of polyphase currents to neurasthenia, atonic dilatation of the stomach and constipation, yet from the explanation of terms, from the useful diagrams in the book and the descriptive text,

anyone, not a specialist on the subject, can gather a practical knowledge of the subject generally. We commend Dr. Herschell's book as one necessary and useful for the practitioner to have.

New Drugs, &c.

DR. MOORE of Galveston, Texas, has found the fluid extract of *Chaparro amargoso*, a Mexican and West Texan shrub, answers well in obstinate cases of several types of dysentery.

Notes and News.

THE Chinese merchants of Manila are having a hospital for Chinese patients erected at their own cost. When completed it will be the most sanitary and up-to-date institution in Manila, and will comprise separate buildings for the treatment of plague, cholera, small-pox, and other infectious diseases.

As soon as the hospital is completed the old buildings at La Loma now occupied will be vacated and destroyed.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Beri-beri.

PH. LAOH, a native doctor of Batavia, has written an instructive and interesting book on the etiology, prophylaxis and treatment of *beri-beri*. He is of opinion that the disease occurs only amongst persons who have for a considerable period been restricted to one uniform kind of food. Dr. Laoh is no believer in the theory of the toxicity of rice, and considers that rice, even of inferior quality, is innocuous if a sufficiency of other articles of diet, such as fresh vegetables and spices are consumed with it. The author is of opinion that a monotonous diet favours the development in the intestinal tubes of various microbes, perhaps toxic microbes amongst them. Different forms of beri-beri are probably originated by different microbes. The author advocates the use of spices as prophylactic, stating that they prevent fermentation of the contents of the intestine. The treatment is simple, consisting merely in the administration of purgatives and spices, and an entire change of diet. In chronic cases the beans of *Phaseolus radiatus* are substituted for rice.

Cholera and Plague.

FOUR cases of plague and cholera existing concurrently have been reported from Manila. At four autopsies the bacilli of plague and cholera were proved by bacteriological examination to be present together in each of the four bodies. The explanation of the double infection is to be found in the fact that the incubation period of plague is from five to eight days and of cholera a few hours only. After contracting plague it is therefore possible to become infected with cholera, and the death may be due to the latter disease before the plague has declared itself.

Leprosy.

MEASURES are being adopted by the Chief Medical Officer of Surinam to suppress leprosy. The incidence of numerous fresh cases demonstrates the correctness of the old-time theory that leprosy is a contagious disease. Isolation of lepers will therefore be reintroduced, though the hypothesis that mosquitoes play some part in the dissemination of the disease places a serious obstacle in the way of the accomplishment of the object the Government has in view.

The population of Surinam are highly satisfied with the *régime* to be adopted, though they contend that there are great difficulties to surmount before practical isolation of lepers will be accomplished.

DR. DEHIO in the *Roussky Vratch*, No. 39, 1902, states that the maculo-anæsthetic variety of leprosy is non-infectious. This conclusion has been denied by Reshetillo, who holds that all forms of leprosy are infectious, and he agrees with other observers that the anæsthetic is perhaps more highly contagious than the tubercular. There can, however, be no sharp line drawn between the two forms of leprosy, for in one family some members may develop the tubercular and others the anæsthetic variety of the disease. At the present time our knowledge of infection in leprosy may be stated to be that the several varieties of leprosy show different degrees of infectivity at different periods of the illness.

Malaria.

A NEW BLOOD STAIN prepared by Laporte is a modification of Jenner's stain. Not only is it a differential stain for all the blood elements, but it will be found an excellent medium for staining the malarial parasite, the chromatin of which it colours a bright carmine tint while the body is stained blue.

The stain is prepared as follows :—

Solution 1.—An unfiltered ½ per cent. solution of Jenner's powder in methylic alcohol. Solution 2.—One part of Unna's polychrome methylene blue solution to 150 parts of distilled water.

The stain is used in the following manner :—

"Take the cover-glass specimen in a Cornet forceps, drop upon it five drops of the Jenner stain and allow it to act one minute, then, without removing the Jenner's stain, pour on ten drops of the polychrome methylene blue solution. Agitate the forceps so as to produce a thorough mixing of the two solutions on the cover-glass. Allow the combined stain to act five minutes longer. Then wash off with distilled water and allow some of this to rest on the cover-glass about one minute longer with occasional agitation of the forceps. At the end of this time rapidly dip the specimen into a very dilute acetic acid solution (about one drop of 50 per cent. acetic acid solution to 10 ounces

of water) until it is of a reddish or pinkish colour. Rinse in water and dry in air. Do not employ heat or filter paper to dry specimen."—*New York Med. Rec.*

Plague in the Philippines.

The *National Geographic Magazine* (U.S.) gives a detailed account of the measures taken to free the Philippines of plague. Plague first appeared in Manila in December, 1899. During the year ending December, 1901, the disease steadily increased, 432 deaths being registered. March, April and May was the period of the year in which the epidemic reached its maximum virulence. During 1902 plague practically disappeared. This is locally ascribed to the strenuous measures taken by the sanitary authorities in Manila. These consisted of segregation, disinfection and a systematic crusade against rats. In the Hospitals after disinfection the floors were cemented, and whitewash was liberally used. To these measures are ascribed the fact that in February, 1902, only one case of plague was recorded, and in March two, as against sixty-three during March of the previous year. The result of these measures is encouraging, and where a seaport can be properly guarded similar methods might be adopted with advantage..

Yellow Fever.

Probable Nature and Life Cycle of the Yellow Fever Germ, by Dr. Carlos Finlay. *Revista de Medicina Tropical*, April, 1903.—Dr. Finlay remarks that, although the germ of yellow fever has never been seen, there are several facts in regard to the history of the life cycle of the fever which are worthy of study. (1) The yellow fever germ requires two hosts for the completion of its life cycle, one man, the other the *Stegomyia fasciata*. This indicates that the germ of yellow fever, like malaria, must be a protozoon and not a bacterium. (2) The permanent host of the malaria parasite is man; but the Stegomyia mosquito appears to fulfil that function in the case of yellow fever. (3) Malaria is a chronic, yellow fever an acute affection, and although it is not definitely known how long the malaria parasite lives in the mosquito, it is known that the Stegomyia is infective for at least two months. (4) Malaria patients are infectious (through mosquitoes) to their neighbours for many months; yellow fever patients (through mosquitoes) for a few days only after the development of the fever. Dr. Finlay considers the yellow fever germ to be a minute protozoon which in the body of the mosquito develops and multiplies by schizogonia. He expects that there will be found in the body of the Stegomyia a larger resting form of the yellow fever germ analogous to the crescent body in malaria.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

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3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—SEPTEMBER 15TH, 1903.

Original Communications.

AN ACCOUNT OF ANTI-MALARIAL WORK CARRIED OUT WITH SUCCESS IN SELANGOR, ONE OF THE FEDERATED STATES OF THE MALAY PENINSULA.

By E. A. O. TRAVERS.
State Surgeon, Selangor.

THE following brief history of a severe outbreak of malignant malarial fever in a malarial district, with a short account of the measures taken to deal with it, will, it is hoped, be of some value as an instance in which systematic efforts, made with a view to the destruction of the breeding grounds of the mosquito, have been attended with immediate and marked success.

The district of Klang, in the State of Selangor, one of the Federated Malay States, has for several years been recognised as distinctly malarial.

The following figures, giving the number of cases treated at the Government hospital, will show the steady increase of malarial fever among the inhabitants of the district.

CASES OF MALARIA TREATED AT THE DISTRICT HOSPITAL, KLANG.

Year.	In-patients.	Out-patients.	Total.
1899	251	668	919
1900	467	737	1204
1901	807	965	1772

GENERAL CHARACTERISTICS OF KLANG TOWN AND PORT SWETTENHAM.

The town of Klang is situated on swampy ground lying between the Klang River, from which it takes its name, and a semi-circle of low hills.

Until September, 1901, Klang was the terminus of the Government railway and the port of the State. Navigation of the river being attended with many serious difficulties, and the accommodation at the port being insufficient for the rapidly increasing needs of the State, it was resolved to make a new port near the mouth of the river. The anchorage selected was a good one, but about half a mile of mangrove swamp intervened between the shore and a wide extent of flat peaty land, partly cultivated by Chinese agriculturists. The mangrove swamp was intersected by a narrow road running up from the coast to Klang, some five miles away.

In the year 1897 a strip of mangrove jungle was felled, and work was commenced by the contractor for the wharves and the Government employés engaged in the construction of the railway, which was continued from Klang to the new anchorage.

While these works were being carried out, the coolies, who were quartered in temporary huts raised above the swamp on wooden piles, suffered occasionally from fever, but no very marked outbreak occurred.

The railway bank running parallel with the shore, as well as the approaches to the wharves and houses, were constructed of earth brought from some miles up the line. In this way a considerable extent of land was partly shut off from the sea, and in process of time large shallow pools were formed by rain water[1] which remained stagnant, the sea-water no longer spreading over the land with each rising tide.

As the work on the new port approached completion the cases of fever occurring among the labour force increased both in number and severity.

On September 15th, 1901, the port was opened, and was named Port Swettenham. Almost immediately afterwards it was noticed that the cases of malaria had increased in number to an alarming extent. Almost the whole of the labour force was attacked, many severe cases also occurring among the crews of the ships lying alongside the wharves.

[1] The annual rainfall in the Klang district averages about 100 inches.

Of 133 persons living in Government quarters, 80 suffered from malaria between September 15th and November 26th. Of 27 temporary shop houses with 127 inmates, no less than 78 persons living in 25 of the shops contracted the disease during the same period. Some 80 coolies were admitted to hospital with fever, and of these 8 died.

The types of fever as diagnosed by means of the microscope were as follows :—

Malignant (æstivo-autumnal) ..	72·5 per cent.
Benign Tertian	25·5 per cent.
Mixed Benign Tertian and Malignant	2 per cent.

No cases of quartan fever were observed.

An examination of blocked drains and shallow pools along the whole of the sea front and by the side of the road revealed large numbers of both *Anopheles* and *Culex* larvæ.

The very serious nature of the outbreak having been fully represented to Government by the Medical Department, a Commission consisting of three medical men and three civil engineers was appointed to advise Government as to the best means of improving the sanitary condition of Port Swettenham. The first meeting of the Commission was held on November 18th, 1901, and the following recommendations were subsequently made :—

(1) That an extent of about 150 acres of the mangrove jungle be felled and cleared.

(2) That levels be carefully taken over the whole of the surroundings of the port.

(3) That the space which it was proposed to lay out as a township be divided into four sections, each of these sections being protected by bunds or banks raised to a height of fifteen inches above high flood level. That each section be provided with one or more main drains and necessary subsidiary drains. The outlet ends of the main drains to consist of iron pipes fitted with flap valves which, while permitting water to flow out of the drains into the sea at low tide, would be automatically closed by the rising tide, so as to prevent water passing up the drains on to the protected area.

(4) That all low-lying ground and disused drains be filled up and levelled with earth brought by rail from up country.

The recommendations of the commission were at once acted upon by Government, and the various works were put in hand without delay. In the meantime, all pools known to contain mosquito larvæ were regularly sprinkled with crude kerosine oil, applied by coolies with watering cans.

The majority of the coolies working at the port were given a daily dose of 10 grains of quinine as a prophylactic.

By December 10th, Dr. Watson, surgeon in charge of the district and a member of the commission, was able to report a marked improvement in the health of the coolies.

Sanitary Works carried out at Klang Town.

The prevalence of malarial fever and the urgent need for sanitary improvements in the town of Klang were represented to Government early in the year 1901, by means of a most able and convincing report by Dr. Watson, who showed that *Anopheles* larvæ were to be found in almost every pool and drain in the town, while at the same time the number of cases of malarial fever occurring among the inhabitants had increased to an alarming extent.

Sanction having been obtained for the necessary expenditure, a large main drain with a tidal flap was constructed, and a carefully planned system of subsidiary drains connected with it, all pools and low-lying swamps being at the same time filled in with earth brought from the neighbouring hills.

Results of Sanitary Work.

The result of the measures taken to improve the health of Klang and Port Swettenham has been most striking, as may be seen from the following figures.

Cases of Malaria Treated at the District Hospital, Klang.

Date.	In-patients.	Out-patients.	Total.
1900 ..	737 ..	467 ..	1,204
1901 ..	965 ..	807 ..	1,772
1902 ..	364 ..	403 ..	767

The above figures show a marked reduction in the number of cases admitted to hospital from the whole of the Klang district.

The following statement relating to the town of Klang and Port Swettenham only is, however, still more remarkable.

Number of Cases of Malarial Fever Admitted to Hospital from Klang Town and Port Swettenham during the Months of October, November and December, 1901 and 1902.

Month.	Klang.		Port Swettenham.	
	1901	1902	1901	1902
October ..	24	8	34	3
November ..	56	2	79	3
December ..	36	1	23	9
Total ..	116	11	136	15

During the year 1901, fifty-two deaths occurred among malarial cases admitted to the District Hospital from Port Swettenham and Klang town.

During the year 1902, only nine deaths occurred among cases of malaria admitted from these stations.

The following return is of special interest as showing that while in the town of Klang and Port Swettenham malaria has decreased to a remarkable extent, in other parts of the district there has been a slight increase in the number of cases.

Cases of Malaria Admitted to the District Hospital.

	1901	1902
From Klang Town and Port Swettenham ..	610	197
From rest of Klang district	199	202

It will be seen, therefore, that in the town and port, where extensive sanitary works were carried out, malarial fever has decreased by 67·37 per cent., whereas in the remainder of the Klang district, which has not

been dealt with in any way, the cases of malaria have actually increased by 3·55 per cent.

This, I think, conclusively proves that the very marked improvement in the health of the inhabitants of Klang Town and Port Swettenham is directly due to the works undertaken by Government and not to a general decrease in the prevalence of malaria in the district.

For the above figures I am indebted to Dr. Watson, whose annual report on the Klang district for 1902 deals fully with the subject.

Cost of Anti-malarial Campaign.

Klang Town.—The total estimated of the drainage and earthworks was $20,000, or about £1,800.

Port Swettenham.—The cost of the various works has been approximately as follows :—

Filling swamps	$15,730·00
Drainage	4,800·00
Bunding, including tidal gates ..	6,400·00
Felling jungle	1,620·00
Miscellaneous	1,450·00
Total ..	$30,000·00

Or about £2,700.

It may be noted that there has been no special expenditure on expert advice, all necessary supervision having been carried out by the regular Government staff. Thus all the money voted for the purpose has been expended on the work itself, the whole of which is of a permanent nature.

I cannot conclude this brief report without alluding to the prompt and businesslike way in which this emergency was dealt with by the Government of the Federated Malay States. The proposals made by the engineering and medical staff were acted on without question and the expenditure of a comparatively large sum of money was sanctioned without delay. The confidence shown by Government in its professional advisers has, I consider, been fully justified.

MUNICIPAL SEWERAGE.

By Major F. Smith, D.S.O.
Royal Army Medical Corps.

Part I.

The systems to be dealt with under this heading are :—

(1) The privy.
(2) The cess-pit.
(3) The pail or dry-earth plan.
(4) The complete water system—main discharging into :—
(4a) The river or sea.
(4b) Sludge tanks.
(4c) Septic tanks.
(4d) Irrigation farms.
(5) Waste water removal.
(6) Refuse disposal.

(1 and 2) *The Privy or Cess-pit emptied Municipally.*—The privy or cess-pit may be emptied periodically by the municipal authorities. In such cases specially constructed carts are used. It is essential that the carts should be water-tight and not be filled so full that the contents can wash over the sides when the cart is in motion. The provision of a good cart is a fairly simple business. The transferring of the privy or cesspool contents to the cart without fouling the surrounding ground is a less easy matter, and it is more difficult with the privy than with the cess-pit. Equally difficult is it to transfer the contents of the cart to the place designated for their reception without polluting the soil on the road.

An Urban Council in 1903.—A day or two ago I examined the appliances of a District Council in a place where a slight patchy prevalence of typhoid has been going on for some time, and has been quite fathomless as to its origin as far as the local sanitary authorities are concerned. The water supply is beyond reproach. At night I witnessed the mode of using one kind of cart, and next day inspected the vehicle. It was what is vulgarly known as a "tumbler," and consisted of an iron tub more or less in antero-posterior section shaped like the letter U. It had an iron lid covering the half and hinged on to a bar across the middle. Four ordinary two-gallon hand-buckets were dangling from a rod at the back. Sticking out of the tub was a sort of gigantic soup ladle for transferring the contents of privies and cess-pits to the buckets, or directly to the tub. Excrementitious matter was evident on most of the outside of the external posterior half of the cart, to say nothing of the buckets. The ladle is always foul and is carried fearlessly about.

A Modern Juggernaut.—This insanitary Juggernaut travels about the streets and the suburban lanes as well as through private grounds, dropping death-dealing germs wherever it goes from the ladle, the cart, and the buckets, the boots of the workmen in charge assisting in this lethal work.

The distance to which infective organisms may be carried indirectly by such means is incalculable. Motor cars, waggons, carriages, cycles, horses, flocks of sheep, cows and pedestrian human beings are travelling along these roads daily. No wonder, then, that the first case of typhoid fever in a village is often a puzzle to the local doctor. In the summer the dried enteric germs are no doubt whirled about the roads in all directions, to the danger of the occupants of the neighbouring houses. Yet the Council responsible for these things is quite pleased with itself. It has buried its head in the sand and is not afraid. Meantime the innocent ratepayers bear the expense of these contrivances for reducing the population. In this case it would be much better if the Council did not worry people about their cess-pits, for the less frequently they are emptied the safer the people will be.

An Improved Cess-pit Cart.—But the Council has got some new pattern carts which have been in use along with the others. One is for emptying cess-pools. This cart is a large oblong iron box with a small circular opening at the top. As accessories there are (1) a hand-pump, (2) two lengths of hose which screw on to the pump after the fashion of fire-engine hose. The pump contains a residual small amount of sew-

age after use, and in removing the hose from the pump this runs onto the ground along with some from the hose-pipes. The latter are wound round an axle on two wheels, and so trundled along with the ends open and dripping fæcal and urinary matter about.

But how is the cart emptied? Not by the pump and hose, but by an escape tube in one corner of the floor. The hole which admits sewage into the tube is closed by a plug screwed down tightly and capable of rendering the cart water-tight if no rag or such-like substance intervenes. On raising this plug the contents of the cart splash out through a leather pipe about two feet in length. The plug, which is attached to a rod which can be worked by the driver of the cart, is then screwed down and the cart moves off with a certain amount of dribbling going on from the leather outlet tube. One cart had no leather tube left; it had been worn off and not renewed. If the contents of cess-pits are dangerous, in regard to specific infective disease, in the same way as privies and pails, these carts are a long way from perfection. For all that, they are a little improvement on the "tumbler," and if used by a working party of careful bacteriologists might be fairly free from danger—as least as far as street defilement is concerned.[1]

A South African Horror.—But I saw a similar vehicle in a South African town noted for enteric fever, a place where the cemetery proved too small for the British victims of enteric during the late war. By way of showing how objects designed for a beneficent purpose may turn out the very reverse of beneficent in practice, I will describe the operations of this South African cart. The only differences between it and the one above mentioned were that (1) there was no pump or hose, as the cart was used for contents of pails which were emptied into the top opening by hand; (2) the plug for the exit hole, instead of screwing down, was pushed into the hole and the handle of the plug rod was caught in a notch to hold it steady. Owing to wear and tear the plug had become loose. This frightful object-lesson of the evils of sanitation in unenlightened hands was in the charge of two negroes. What presented itself to my senses when first I encountered the thing was a foul-smelling cart covered with fæces, and flies battening thereon. One negro handed up pails, which were upturned by the other, and the semi-fluid contents emptied on to the hole, most of the stuff going through and some on the level top. But the most awful thing was that the loose plug allowed a steady trickle of sewage from the cart; and so, enteric raging at the time, a trail of enteric excreta was being laid from house to house, street to street, &c., daily. I asked the man on the cart if he could not close the exit hole. He promptly seized the handle and jammed it down forcibly, with the result that the plug slipped out of the hole and in a twinkling several gallons of fresh excreta were on the ground. No privy of the old capacious pattern could cause more harm than the above-mentioned cart. For after all, the much-abused privy such as we see now in the grounds of old-fashioned farm-houses, was a real cess-pool in the shape of a large cavity below the surface of the ground. It may be said of it, as in the case of the cess-pool system proper, that it is in reality the much-vaunted septic tank on a modified scale, and with an insufficient amount of water. It is an unpleasant place to sit in as a rule. It was so rarely emptied that it is very doubtful if enteric bacilli would survive (among the other organisms which flourish therein) from one clearing date to another, whereas this cart meandered round every day.

The Council's Soil Carts in relation to Food Supply.—Now, what becomes of the contents of the carts? They are usually taken out into the country and emptied on to the land, either directly, or after being accumulated and somewhat dried in tanks, holes in the ground or banked up earthy enclosures; in other cases they may be emptied into the sea. In the particular place referred to as possessing the tumbler they are taken to some small farms and market gardens just on the fringe of the suburbs, and there turned on to the ground, the agricultural community being willing to allow this provided there is nothing to pay. We get our spring onions and lettuce from the gardens—also a few very fine strawberries. We must take plenty of vinegar with our salad, and give up the plebeian habit of eating plain lettuce and onions with bread and water—we must also avoid green sandwiches at picnics, &c.

(3) *Municipal Pails and Dry-Earth.* — As to the ways of a local sanitary authority (or contractor) with regard to the pail system, either with or without dry-earth: one way has been mentioned above—the carts described are used to empty pails into. In the Tropics the pails are generally washed, and very often this washing is done somewhere quite close to the closet, so that it constitutes a danger and a nuisance.

In Singapore and some other places the large (municipal pattern) pails are taken right away into the country, where they are emptied, washed and dried in the sun. Meantime a clean pail takes the place of the one removed, and is in its turn removed next day.

The Commode.—But the better class of Europeans, and some of the Orientals,[1] in Indian, Malayan, and other Eastern stations, have an ordinary commode for each person. It is situated usually in the bath room, which is a brick- or cement-floored room in the basement, and has a drainage hole leading to the outer air; if upstairs, the bath-room has always a waterproof floor. The bathing places are thus prepared in order to allow for the Eastern system of bathing, by splashing hand buckets of water over yourself while you stand on the floor. This creates a temptation to the man who comes to empty the commode; the vessels containing urine are emptied by the same individual; he generally empties them on the floor of the bath room. The commode is supposed to be pretty well always empty; twice a day, as a rule, the man who has this job visits the bath room, and if necessary takes the commode pan away—generally behind the kitchen or stables—and empties it into a

[1] The carts bear the name of a well-known maker, and are thought to be of quite modern, improved type.

[1] The Chinaman's favourite device in the way of a privy is well known, but he is gradually taking to our way of doing things in our colonies.

large iron pail. He washes the commode pan on the spot and defiles the ground in doing so. I have wandered from my subject—municipal pails.

Singapore Pails and the Chinese Gardener.—The municipal pail is supplied with a more or less closely fitting lid. In Singapore strings of Chinamen may be seen and smelt every morning pursuing their way into the country with these pails upon their shoulders. Bullock carts are also used, carrying a number of pails at one time standing on the cart-floor. The Chinese market gardeners, who have done so much for the comfort of life in Singapore, place great value on the pail-contents; they store the material in open pits in their gardens. They also store in the same place all the urine they can get hold of. The mixed product they distribute with scrupulous care on individual plants. At night (this time is selected because the sun in the day time would quickly dry up the manure) they may be found going along the rows of vegetables and, lighted on their way by a lantern, pouring small quantities of liquid manure from long-necked cans upon each individual plant. The results, from the gardener's point of view, are excellent. In a land which in the earlier days of the settlement suffered sadly for want of vegetables of any description, a plentiful supply of cheap green food can now be obtained.

Penang Pails and Enteric Fever.—In Penang, where, in common with the rest of the Straits Settlements, this plan prevails, a former acting Municipal Health Officer—Surg.-Major D. O'Sullivan, Army Medical Staff—gave it as his opinion that an outbreak of enteric was due to this plan. The soldiers in barracks were in the habit of buying largely, from one of these gardens, of greenstuff which they ate raw. The troops which came from India to Penang brought a case or two of enteric with them as a rule, and it was believed that the barrack latrine pails were taken to the same garden from which the greenstuff came. No other Europeans had enteric. In the following year I saw a Chinaman who (as the *post mortem* showed) had died of enteric, though treated for malaria. The local water supply was very good and brought from a distant hill. The catchment area was certainly not absolutely clear of inhabitants, but there was no one living on the banks, and cultivation was cut down as much as possible. The clear and sparkling water had some miles to go in mains before it reached the barracks and town. It is therefore quite possible that the M.O.H. was correct in his surmise. For, after all, it was only a surmise. Enteric was not looked upon as endemic in the country. To the best of my recollection there had been no case recorded for years in the pauper hospital—a very large institution. The *post mortem* in the case above alluded to—the Chinaman—was held at my suggestion, when I saw the man dying, that the case looked like enteric. It may therefore be supposed that there were other unrecognised cases about—in fact, a year or so later, the Hon. Dr. W. C. Brown came out to Penang with an outfit for making serum diagnosis, and soon after he published a paper to the effect that he had discovered a good many cases which had not been diagnosed as typhoid before the serum test was applied. However, I, like the M.O.H., am merely surmising—for all these later cases may have been derived from the soldiers. Typhoid in barracks, too, had been known to occur from time to time before the period mentioned.

Sir Patrick Manson, who knows the Chinese better than I do, says these people use the excretal matter after it has fermented, rotted and, presumably, become less harmful. This may be so in a way, but I was under the impression that they kept adding to it—the gardening Chinaman, I thought, had no closet except the store-pit for himself, his labourers, and his family. Singapore was not a notably enteric place, though the soldiers had occasionally small outbreaks, just as in Penang. I am not aware that in Singapore it was ascribed to green food; it was, I think, supposed to have been imported by the regiments from India, and to have spread in some unknown way in barracks. I may say that in the matter of general cleanliness and sanitary arrangements, Penang barracks (now abandoned as an imperial station) were as clean as any I have seen, or as any barracks could be. Whether the gardeners were to blame or not there is no doubt that the direct transfer of pail contents to gardens is to be deprecated, the water in which the pails were washed might be used for the plants and would be as bad as the crude fæces. In leaving this question, I may say that from private sources I gather that Singapore—which in my time was regarded as an exceptionally healthy place for a tropical station—has recently been visited by prevalence of enteric among European civilians.

Indian Dry-Earth Pails and Enteric.—In India some army outbreaks of enteric—*vide Army Medical Annual Reports*[1]—seemed almost certainly due to the blowing of dust, from a sort of dumping ground for earth closet pails, towards the barracks. No other cause could be found by the experts who investigated the outbreak. The cases occurred mostly on the side nearest to the aforementioned ground, and the numbers gradually decreased in proportion to the distance from it.

We see, then, that the pail system, with or without dry earth, when used intelligently by well-to-do people may be pleasing enough to the well-to-do as far as their own immediate surroundings are concerned. It is not free from grave dangers to the community owing to carelessness in the choice of a site for washing pails, and still more on account of the ways in which the contents are ultimately disposed of.

These dangers are perhaps more serious in the Tropics than in Europe, in consequence of the work having to be left to low-class natives, absolutely ignorant of the most rudimentary principles of hygiene; also in consequence of the greater prevalence of flies and dust-storms, and of the torrential rains which temporarily flood large areas of ground. In further illustration of what is said about the native scavenger, I give the following two accounts of what I have seen myself.

South African Railway Pails and Enteric.—At the stations on some of the South African railways pails

[1] *Army Medical Annual Report*, 1898, &c. Eyre and Spottiswoode.

are in use. Encamped near one of these stations in a small village, I rode round the surrounding ground. About thirty yards behind the station on the bare ground I found about a cartload of fæces, which had evidently been turned out of the station pails. This was at an early period of the campaign in the part of South Africa referred so that the practice was clearly not the result of the war. To screen the offensive heap a little from the public view it had been placed in a slightly depressed portion of the ground, and the first rain therefrom would wash the collection into the nearest water-course. The system, however, was all that could be wished for as far as the railway passenger could see. Some officers and soldiers who had that day sickened with fever, which ultimately proved to be enteric, spent the night and part of a day in the railway station waiting for a train to the base hospital.

Sierra Leone Pails and Enteric Fever. — Again, in Sierra Leone, the contractor for emptying the pails from the military hospital—the work was performed under cover of the darkness—was found to have been for some time putting the contents of the pails into a neighbouring surface drain, which was rather deep, shaded by a culvert, and out of the way of pedestrians. It was not observed until the smell caused a special search to be made. The man was paid, of course, for taking the stuff away out of the town. He had washed the pails on the ground near the drain. The drain ran only 200 yards underground from the culvert and then widened out into a wide open surface ditch, unlined by masonry, which traversed the most populous part of the town, and was frequently paddled in by ducks, goats, and children. Pedestrians washed their bare feet and hands in it. There was a case of enteric in the hospital a few weeks before the discovery was made. The contractor was warned and fined the maximum penalty—£5. A few weeks afterwards, attention being called to newly turned soil near the barracks, closer inspection revealed masses of maggots, flies in various spots, and streaks of fæces oozing up in some. The contractor had chosen shallow burial, very shallow indeed, as an alternative to the use of the drain. He was again fined and deprived of his contract, but this did not deter others from pursuing similar practices. (The sanitary inspector was an educated native.) Such things as the above occur as a rule rather than exceptionally in the Tropics, and this fatal disposition of the denizens of hot countries to shirk their work has to be reckoned with in schemes of drainage and sewage.

(4) *The Complete Water System.*—Here we have large sewers converging into larger ones, and finally comes the main sewer, which varies from a foot or two in diameter to a brick and cement structure which is large enough to allow of a man walking in it. The size depends, of course, on the number of people whose off-throw has to be dealt with, and on whether or no waste water, roof water and surface water have to enter the same system.

The remarks about the correct laying of house drains apply also to the main drains. A perfectly water-tight system is probably never attained to, but the openings may act sometimes as inlets to ground water, and at other times, especially if the drain is choked, as outlets. The main drains or sewers have to be ventilated, as most persons who have stood near a grated manhole in still weather, when the atmospheric pressure is low, are by this time painfully aware.

It is, however, in the method of disposing of the effluent sewage from the main that the chief interest of this system lies.

Excreta to the Waterways.—The simplest way of getting rid of the sewage, and that formerly adopted in most places, is to discharge it into a river or into the sea. This is merely a continuation of the habit of primitive peoples. In the earlier days of the world, when population was scanty, when there were no roads, and especially when there was much forest land, the sea and rivers were the chief highways, and people naturally settled either on the shore near an estuary or on the banks of rivers. They had an additional inducement in the necessity for water to drink. Rivers were also a source of food supply in the shape of fish. For the two latter reasons also, those who elected to live further inland, driven away perhaps by their enemies, found it convenient to settle on the smaller streams. Here they got their drinking water up-stream, and having a certain amount of thought for themselves, fouled the watercourse mostly below the source of drinking water, but had not knowledge enough to be afraid of contamination of the water by people living further up-stream than themselves. So long as villages were few and far between little harm resulted on big and rapid rivers. The various living things, ranging from amœbæ to large fish, which fed on excrementitious matter, together with oxidation processes combined with free dilution, reduced danger to a minimum. The same course of events can be seen in practical application in uncivilised countries in the present day.

When population increased, however, river pollution became much more marked, and some waterways, like our own Thames, became to all intents and purposes mere sewers.

The Sewage Problem.—Scientific men in various professions are now seeking a solution of the problem of sewage disposal, with a view to reducing the nuisance and danger to health arising from the pouring of huge volumes of sewage into rivers and into the sea.

Oysters.—The discharge into the sea is of itself more of a nuisance than a direct danger to health. Oyster beds have been poisoned, however, and the oyster-eating portion of the community have suffered thereby: foci of disease by which non-oyster-eating people may be infected have been thereby created.

Tidal Back-flow.—The tide is apt to throw back sewage on to the foreshore, and also to stop the effluent pipe and so cause sewage and sewer gas to be forced through every weak spot in the chain, passing sometimes into houses.

River Pollution.—Still, the waterway is such a convenient means of removing waste matter that we are loth to cease to utilise it for this purpose, and the danger therefrom has been reduced in civilised countries by the almost universal construction of elaborate waterworks to bring pure water from a distance in pipes, thus rendering it unnecessary to drink the polluted river water.

Acts.—Since the passing of the Public Health Act of 1875 it has become illegal to pollute a watercourse with sewage in this country as far as new works are concerned. A further Act was passed in 1876—the Rivers Pollution Prevention Act dealing especially with pollution by trade effluents and refuse. The adoptive Act of 1890—Public Health Amendment Act—contains references to pollution of streams.

London Water.—In London the water has been obtained from the river above the chief places of pollution and filtered, so that waterborne disease direct from the river is believed to have been rare. Even under such a system the river might exert an influence on health. At Maidstone, for instance, where the river runs in the bottom of a valley, the sides of which are largely devoted to culture of fruit trees which are manured with London street and slaughter house refuse, the river is much polluted. The water main in part of its course is in the bed of the river, so that given a flaw in the main, contamination of drinking water is possible.

Constitution of Waste Water.—The water used for washing men, animals, streets and all the water used in so many different ways in our town existence must be disposed of. Waters of this kind are not much less dangerous than the actual human excreta—in fact washing water contains a certain amount of excretal matter. The pollution of streets by animals, together with the prevalence of the habit of spitting and micturating in the streets, cause the surface drainage water to be in reality sewage. Surg.-Major Parkes said: "It would be a waste of economy to allow this water to pass off without applying the force which has been accumulated in it for another purpose." It might therefore, he thought, be let into the sewers to flush them. This will be referred to later on.

Sewage Purification.—A brief notice of the means adopted, with a view to purifying more or less the effluent sewage, will suffice for this article. The object of the methods is to render harmless the watery portion of the sewage, so that it may be fearlessly discharged into a watercourse, lake or open sea. It is obvious that the water must be allowed to run away somewhere, and there is no feasible way except letting it sooner or later reach some natural waterway.

The methods in use are tanks, precipitation tanks with or without the use of chemical precipitants, artificial filtration, land filtration and irrigation (land filtration and irrigation are terms applied to two kinds of what are commonly known as sewage farms). An extension of the precipitation tank method is what is called the "septic tank" (this is combined usually with artificial filtration, sometimes named bacterial filtration).

In all the tanks the idea is to get rid of the more solid part of the sewage (not a very large proportion to the whole amount—some 2 or 3 lb. per ton is a high estimate).

The Simple Tank.—The tank is a large watertight pit—usually oblong—into which the sewage enters at one end and passes through an opening at a high level the other end. There may be a series of tanks passing one into the other. The rate of flow in the tank is slow. The very heavy matters sink to the bottom of the tank; but there is very little heavy matter in sewage. The solids are mostly light, or become so as gases are formed in them by decomposition, and they collect as a scum on the surface while the water flows away. Periodically this scum (which may be several inches thick) and the deposit as well are removed, the water in the tank being run off. The solid is known as "sludge," and is used as manure generally after it has been dried.

If a precipitant of lime, alum, iron, zinc, manganese or other chemical be added to the sewage a greater proportionate amount of solids is recovered and there is less top scum. Sometimes deep tanks, narrow at the bottom, are used; the precipitated sludge passes out by a pipe from the bottom of the tank into a special receptacle, while the effluent water from the surface runs away at a higher level—this seems to be a ready method of separating the solids from the liquids.

If the sludge be used as manure, the objections in connection with cess-pools apply equally to this, and as far as specific disease is concerned the effluent is probably as dangerous as if the solids had not been in great part taken out of it.

Filtration.—In filtration schemes the sewage is poured on to filter beds, and only the more watery part passed into the river or sea after passing through the filter. The filter consists of some feet of gravel and sand, small coal, coke, broken clinkers or something of the kind. The beds last for a long time owing to the action of bacteria in liquefying the solids.

As the old filtering material is not well suited for manure it is not likely to produce illness on that score, though if it be not destroyed in some way it is a possible source of disease, as will appear later on in a reference to experimental bacteriological examinations of filter sludge and effluent at Crossness by Clowes and Houston, working for the London County Council. The safest plan is to burn or subject to high temperature the old filtering material.

Sewage Farms.—Land filtration, irrigation, broad irrigation and sub-irrigation are varieties of sewage farms. In the first two the sewage is poured on to a small quantity of land, through which the watery portion sinks and then passes away. Vegetation of some sort is generally grown on the land, but that is a secondary consideration. In broad irrigation the sewage is conducted over large areas of land specially devoted to the cultivation of crops. In sub-irrigation the sewage is distributed over the farm in loosely laid subsoil drainage pipes about a foot or so from the surface of the ground. Here, again, the disease-bearing sewage is poured on to the surface of the land, and, apart from the danger to the workers on the farm, it would seem possible that pathogenic organisms could be carried abroad by men and horses employed on or visiting the farms. The grass, vegetables, &c., might conceivably be the media of conveying bacteria from the farms to the outside population. The danger from this source would be diminished if vegetables intended to be eaten raw were not allowed to be cultivated on sewaged grounds. Italian rye grass is always said to grow best on these farms, but roots and cabbages

are also grown. If we trace the history of a load of grass to its final destination, or the cabbage until it is finally washed in the same water perhaps as the radishes in the kitchen, we shall, if we have any experience of bacteriological work, be able to see many ways in which disease might be contracted from a sewage farm—and that with very little likelihood of its real origin being traced. The consensus of opinion, however, is that sewage farms do not constitute a danger to the public health. Nevertheless, Surg.-Major Parkes mentions Dr. Clouston as having recorded an outbreak of asylum dysentery from this cause, and Dr. Letheby as having ascribed enteric fever at Copley to a similar agency. But asylum dysentery is so frequently recorded where no sewage farm could be blamed, that it would require some strong proof to establish the certainty of the sewage farm influence in its etiology. The P.M.O., Aldershot (*Army Medical Department Annual Report*, No. 23, 1881), alluding to the North Camp sewage farm, which has always been so bitterly complained of as a nuisance, says, "No injurious results on the health have been traced to these smells." All the P.M.O.'s, however, have not been of the same opinon. There is no doubt, at all events, that they constitute an effluvial nuisance, and ought not to be near dwellings.

The Septic Tank.—The septic tank is similar to those already mentioned, but it is covered in to exclude light and air. This is to give the anaërobic sewage-liquefying bacteria a chance to increase and do their work. Having passed through the tank, the sewage is spread over filter beds as a rule, and the aërobic bacteria now have their turn. It is claimed that scarcely any scum or sediment is left in the tank, and that consequently it does not require cleaning out except at very long intervals—many years. A grit-chamber intercepts very heavy material before the sewage enters the tank. The sewage leaving the tank is said to be almost odourless. There is a certain amount of imagination about this. I know a septic tank establishment of one of the latest patterns in which the effluent smells very badly before it has passed through the filters. The construction manager says he cannot smell anything—he has got used to it, like a man who stays a long time in one of the old-fashioned country retiring houses. Meantime, people passing that way rush by with their handkerchiefs to their noses.

The Grit Chamber.—The contents of the grit chamber have to be dug out and disposed of; they may be presumed to be as dangerous as sludge, but the amount is not very large and could be roasted.

The Storm Water Difficulty.—There is one way in which most of these systems fail from time to time to do all that they are supposed to do. Storm water has to be provided for. How is this done? Provision is made for the overflow between the sewer outfall and the grit chamber; if small in amount the overflow may be accommodated in a special tank kept empty for the purpose. If the overflow comes quickly and in great volume it is run off into the same place as the clarified effluent, that is to say, the crude sewage goes into the waterway. This cannot happen very often in Britain if the system has been well planned and constructed. But we cannot condemn a system altogether because it fails occasionally; the greater part of the annual sewage flow is filtered all right. In the Tropics, however, the overflow would have to be let run wherever it could about twice a day during the "rains," so that the septic tank and filter would be useless for a good part of the year.

The filtering bed has to be cleaned, and at least the top layers renewed occasionally. The old material should be treated as before stated to render it harmless.

Worth of the Septic Tank.—That the septic tank and filtration combined reduce the solid matter to be let into the river, sea, or wherever the watery sewage is going, there can be no doubt. The filter without the septic tank will do the same. Whether the life of the filter used for sewage from a septic tank is sufficiently in excess of that of the filter used for crude sewage to compensate for the increased expense of building septic tanks I do not know. Dr. Geo. Reid, in his "Practical Sanitation," appears to favour filtering as the more wholesome process if the filtering medium is composed of large particles. In his own words, "At least equal success has been achieved by means of *large grain aërobic biological filters*."

The Effluent not Safe.—The most important fact in connection with these fashionable sanitary inventions is that none of them have been shown to render the final effluent so free from pathogenic bacilli that it could be safely run into drinking water. It is not clear, therefore, that we are any better off than before. Withal it is probable that the effluent is sufficiently free from organic matter to make it likely that the bacteria in it would not increase and would themselves die out soon for want of food if the effluent were passed into pure water; but pure water is not common in rivers now-a-days apart from sewage pollution.

Crossness Experiments.—In the examination of coke beds at Barking and Crossness for the London County Council, tetanus, tubercle, colon, and many other bacilli were found in the slimy covering of pieces of coke in the beds. Bacilli suspiciously resembling tubercle were also found in the effluent. In a general way "little or no real distinction could be made out between the cultures made from the crude sewage and those made from the effluents." Concerning the examination generally as set out in Table II. of the Report to County Council, it is stated, "This table also shows that the effluents from the Barking and Crossness precipitation tanks are no better, if indeed they are not worse, than average samples of the raw sewage."

From the above it may be gathered that the æsthetic advantages of filtration are decided, but that it has yet to be proved that any other benefit to the community accrues from the method.

Regarding water systems of sewerage generally, it is usual to point to improved health of towns due thereto but inasmuch as pure drinking water is supplied and other means taken at the same time as a rule, it is hard to say how much of the better state of health is due to altered drainage.

(5) *Waste Water Removal.*—From a municipal point of view, surface and slop water are sewage, and where a water system is in vogue slop water is almost invariably

admitted into the house drains and so is the roof water. The practice varies with regard to surface water—a separate set of drains is frequently provided for it, partly because they have in many cases been made before the water system for sewage came in. Where the dry systems are in vogue there must be a water system for surface water. Probably in the Tropics the whole of the surface water could not be admitted into the sewers; that is a question for engineers. As a matter of economy, it would seem desirable when inaugurating new works to admit all the water into one system. There are dangers in this, and in trying to do too much the whole plan may be spoilt—we may have sewage coming out of the drains if they are too full. In most tropical places some provision has had already to be made for waste water, and as previously said, it usually consists of house and street surface drains, open, flowing into main channels, which are in some places open water-courses and in others sewers. On the whole I am inclined to the opinion that such a system is the best for the Tropics—that the arrangements for excreta should be distinct.

(6) *Refuse Disposal.*—Solid refuse can never be admitted to sewers. Refuse is apt to be a grave nuisance in the Tropics owing to its rapid putrefaction in the high temperature. The best system of removal is to have an iron pail for each house put out in the street every morning to be emptied by the municipal scavengers into their carts. The refuse can then thrown into the sea if there be a suitable place, burned in destructors (a somewhat difficult matter on a large scale), or utilised in filling up selected hollow places, reclaiming land, &c. The pails ought to be supplied by the municipality, and should have lids which cannot be detached easily from the pail.

In reclamation work inland the position of the land with regard to sources of drinking water should be borne in mind. Reclaimed land often proves a valuable asset to the local government. It should not be covered by dwelling houses for about five years or more afterwards. The English law gives a minimum limit of three years; this is, however, often treated with little regard in towns where the latest Acts have not been adopted.

The ground on which refuse is emptied should, if possible, be prohibited to the public. In England it is customary to see a number of adults and children grovelling in the refuse for rags, bones and other valuable material which may exist in town rubbish.

The local sanitary authority is apt to be more to blame than the people for the accumulation of refuse. It is common in eastern towns to see the public refuse bins almost covered up with excess of refuse, either because the number of bins supplied is insufficient or because they are not emptied often enough, or from a combination of these two causes. Anyway, the bin is generally productive of a foul-smelling nuisance, inasmuch as the door at the ground level for emptying by permits escape of fluid and even if the people do not put fluids into the bin the rain enters and emerges saturated with organic matter.

The System Chosen.—After this somewhat lengthy exposition of our present knowledge of drainage and sewerage systems,[1] the good and the bad working thereof, we come to the chief portion of the article, viz., "The Choice of System Suitable for the Tropics."

(*To be continued.*)

[1] I have purposely left the pneumatic systems out of the discussion.

A BREEDING PLACE OF CERTAIN FOREST MOSQUITOES IN MALAYA.

By G. F. Leicester.
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With a few exceptions the mosquitoes which are found in towns and houses, and which breed in roadside puddles, artificial collections of water in the neighbourhood of houses, and open sheets of water such as small lakes and swamps, are not the mosquitoes found in the jungle. Neither are the jungle mosquitoes often seen in the house, nor are their larvæ taken in the places above mentioned. Search in such small pools as one finds in the jungle here yields but a few species of the genera *Uranotænia* and *Culex*, and always the larvæ of very small species of those genera. In the streams we find the larvæ of three Anopheles, *Anopheles leucophyrus*, *Anopheles Treacheri* (n. species), and one so far unidentified as the few larvæ obtained died. In rock pools beside the stream and only exceptionally flooded a species of *Stegomyia* (n. species) and a *Uranotænia* are found. Thus the breeding place of the large number of species of adults which were constantly found was yet unaccounted for. Further search showed that one of the most important breeding places in the jungle is the water which collects in the bamboo, either in the stumps of old bamboo or in the cavities of fallen bamboos which in some cases have cracked in drying and allowed water to accumulate in them, or even in standing living bamboos in which some insect has bored a hole in the stem and allowed water to enter. In almost every such collection larvæ were found. I have now collected from this source the larvæ of six new species of *Megarhinus*, five new species of *Uranotænæ*, two *Wyeomyiæ*, four undoubted species of *Stegomyia*, three of which are new species, and five species I have placed provisionally in this genus awaiting the decision of Mr. Theobald, two anopheles, *Anopheles leucophyrus*, and a new species with beautifully feathered hind legs like an *Ædeomyia*, and which I have named *Anopheles asiaticus*, three *Armigeres*, three *Culex* and other larvæ of one mosquito, which I cannot place in any genus yet given in Mr. Theobald's monograph.

Anopheles asiaticus I believe to be exclusively a bamboo breeder; the larvæ of *leucophyrus* were also found in a muddy pool in a cart track running through dense jungle and, but always in jungle, in many other situations. The only collections of water in bamboos in which I have taken it have invariably been that collected in the half of a bamboo which has been split longitudinally, and the water has therefore been open to the air, the conditions obtaining being quite different to water contained in the internodal cavity of a bamboo which has merely a crack in its upper surface to allow

the admission of the water and the adult mosquito. In the one case the water can be, and almost always is, foul and stinking from the presence of decaying vegetable matter and even animal fæces, while in the other case the water is shielded from any such contamination, and is generally clear and not foul. That some species of Anopheles can breed both without direct sunlight and even practically without light, the presence of these larvæ in such situations definitely proves. In the JOURNAL OF TROPICAL MEDICINE, April 1, 1903, there is a review of an interesting paper by Adolph Lutz in which he mentions some of the curious breeding places of true jungle mosquitoes, as for instance the collections of water in the pitcher of pitcher plants, and at the bases of the leaves of certain bromelias. In such places he found the larvæ of *Anopheles lutzii*, certain species of *Megarhinus* and other mosquitoes. He says in this connection, "The author, after many years' observation, is confident that the typical forest mosquito without exception spends its larval condition in the water of the Bromeliacea." That this statement is too sweeping these observations show. More extended research may show that out here too the Bromeliacea often afford breeding places for mosquitoes, but at present I have not come across any except the various species of wild and cultivated banana.

Many other aquatic larvæ of insects are found associated with the mosquito larvæ, some of which as natural enemies play their part in keeping down the numbers of mosquitoes by destruction of their larvæ. Probably the most important of these natural enemies are the larvæ of the various species of *Megarhinus*. These larvæ are entirely carnivorous. My observations so far tend to show that in each collection of water the adult female deposits but very few eggs, possibly not more than two. Of one species I have never found more than one larva in any one collection of water if the larva is more than a few days old. I have on one or two occasions found two larvæ of this species together when very young, but I am convinced that if more eggs than one are laid and hatched in a short time all but one disappear, having been eaten by the survivor. That they eat one another even when nearly full grown I have proved again and again, even though other larvæ are present. This cannibal tendency is specially marked in one species. I have not succeeded in obtaining eggs of any of these *Megarhinina*, and therefore cannot speak absolutely as to the length of the larval stage, but I know it covers a period of more than fifteen days even when plentifully supplied with food and at the temperature of the air, 80°-90°. The pupal stage is almost exactly six full days. My belief is that about three weeks is the duration of the larval stage of a Megarhinus with plentiful food supply. During this time they must consume an enormous number of larvæ, as they are very voracious. Scarcely any collection of water in a bamboo containing larvæ is without its Megarhinus larva lurking in its darkest depths. Other natural enemies are the larvæ of certain species of *Agrionidæ*, *Libellulidæ* and *Chironomidæ*.

Besides these the larvæ of certain *Tipulidæ* and *Syrphidæ* are to be found, and in water in the more open bamboos numerous species of tadpoles and the closed or open joints not containing water are favourite breeding places for larvæ of many insects—*Coleoptera*, *Orthoptera*, *Hemiptera*, *Hymenoptera*, &c.

The full study of the bamboo as a breeding place for insects would, I feel sure, well repay careful and prolonged work.

THE ETIOLOGY OF SLEEPING SICKNESS.—The second commission sent to Uganda, consisting of Lieut.-Col. David Bruce, F.R.S., R.A.M.C., and Dr. David W. Nabarro, to investigate sleeping sickness, have in their report dated from Entebbe, May 29th, 1903, confirmed Dr. Castellani's discovery of the trypanosome in connection with sleeping sickness. They have found the parasite not only in the cerebro-spinal fluid but in the blood of all cases examined. They have examined a large number of persons in the sleeping sickness area, but free from sleeping sickness itself and in no instance have they found the trypanosome in the cerebro-spinal fluid. An experiment made to test the possibility of the tsetse fly being the carrier of the sleeping sickness trypanosome (Castellani), proved successful in the case of an animal—in this case a monkey. These are important results and go far to show the correctness of the suggestions advanced by Dr. L. Sambon, in the JOURNAL OF TROPICAL MEDICINE, July 1st, 1903.

CARBOLIC ACID TREATMENT OF PLAGUE.—J. Mitford Atkinson, M.B.Lond., Principal Civil Medical Officer, Hong Kong, gives details of the treatment of six cases of plague treated by carbolic acid given internally (*Lancet*, September 12th, 1903). The general plan of treatment was as follows: carbolic acid was given in twelve grain doses every two hours for sixty hours; after this the dose was reduced to six grains every four hours. If untoward symptoms, such as carboluria, appeared, the dose was further reduced to two grains twice daily, and was continued for fourteen days.

A NOTE ON ANOPHELES FULIGINOSUS AND SPOROZOITES, by J. R. Adie. *Ind. Med. Gaz.*, July, 1903.—During his stay in the Punjab, Adie, while examining an *Anopheles fuliginosus*, discovered that it harboured the crescent germs of malarial parasites. The observation is of importance from the fact that the crescents in India have hitherto only been found in *Anopheles fluviatilis* = *Anopheles Christophersi* (Theob.) = *Anopheles Listoni* (Liston). Moreover these varieties are never found in the Punjab during the winter (February, March and April), but the *Anopheles fuliginosus* is present during that period, and the author, therefore, is convinced that it is this mosquito that originates the attacks of fever during the winter months.

TO ADMINISTER QUININE TO CHILDREN.—A French pharmacist states that a good way to administer quinine to children is to mix 1 gramme (15 grains) of the sulphate in a mortar with 8 grammes (2 drachms) of olive oil. Twenty drops of this mixture will contain 5 centigrammes (¾ grain) of quinine. The mixture is poured into a tablespoonful of sugared milk, and will be easily swallowed.

The article on "The Condition of the Blood in Filariasis," published in the JOURNAL OF TROPICAL MEDICINE, September 1, 1903, was reprinted from the *British Medical Journal*.

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THE

Journal of Tropical Medicine

September 15, 1903.

THE PLAGUE AT MARSEILLES.

Western Europe is again threatened with plague. The appearance of some twenty-nine cases of plague in the immediate neighbourhood of Marseilles brings home to us the fact that so long as plague exists to the east of the Suez Canal, so may we expect to have occasional outbreaks of plague at our seaports. The disquieting part of the announcement, however, is that it is a ship from Smyrna—a Mediterranean port—that is accredited with bringing the disease to Marseilles. In a cargo of rags from Smyrna (one report says Constantinople) a number of dead rats were found, and amongst the persons engaged in handling the bales of rags, plague appeared. Some of the cases are stated to be bubonic in character and some pneumonic. No official statement of the manner of importation or the extent of the outbreak is to hand; all we know is that a number of cases of plague have occurred in Marseilles, and it behoves the sanitary authorities, of the Western European ports more especially, to be on their guard. We would insist, however, upon all Medical Officers of Health at our ports not to confine their attention too rigidly to rats as being the only animals likely to be infected by plague. Other animals besides rats are liable to plague. Fowls, sheep, pigs, cattle, cats, dogs, monkeys, &c., may be brought on shore, and, whilst the rat is being strenuously dealt with, plague may appear in consequence of some of the domestic animals infected with the disease being brought on shore. The rat, although perhaps the most liable of animals to plague, does not, perhaps, constitute the greatest danger in regard to the importation of plague. The rat speedily shows signs and symptoms of the disease and quickly succumbs, but several domestic animals, as shown by Professor W. J. Simpson and Dr. Hunter, may have plague upon them for weeks and yet show no indications of ill-health. A pig affected with plague may have a temperature of 103° or even 105° F. for weeks and yet to all appearances enjoy good health. The animal may be landed in a condition of apparent good health, yet all the while bacilli are escaping in the fæces and urine of the animal, and infecting the soil with plague bacilli.

In the same way fowls, ducks, geese, turkeys, parrots, pigeons, quail, may become sources of distribution of plague, as well as pigs, sheep, goats, &c., &c. It behoves the sanitary officers, therefore, to allow no animal on board ship to be landed as a matter of course from a plague-infected ship. If it is intended to save these animals their temperatures must be taken, their blood or excretions examined for plague bacilli —a most laborious process—before being pronounced fit to land. The safest and most hygienic plan is, of course, to kill all the animals on board a plague-infected ship, and burn their bodies, or throw them into the sea at a distance of not less than three miles from shore. The former method would be the safer, as we do not yet know that fish are not liable to plague.

The multiplication of the channels by which

plague may be imported is not pleasant reading, and adds immensely to the difficulties which Medical Officers of Health at our seaports have to contend with in warding off the disease; yet it is no good shutting our eyes to the facts; and whilst hunting rats we may find that the disease has stolen a march upon us and that the town has become infected by pets, or by domestic animals brought on shore. In Glasgow two years ago an outbreak of plague occurred, yet were no rats found infected at the time: it was twelve months afterwards before the rats showed evidence of having contracted plague. In Glasgow (an other instances, no doubt) it is more than likely fowls or other animals, brought from a ship arriving from a plague-infected centre, were sent on shore and sold or otherwise distributed and proved foci of infection. The fact that domestic animals contract plague accounts for the persistency of the disease in infected areas, and for the sporadic cases and limited outbreaks that from time to time alarm us in Europe.

Review.

A Review of the Report of the Commission on Dysentery and Enteric in the Late South African War. By Andrew Duncan, M.D., B.S. Lond., F.R.C.S., M.R.C.P., Physician to the Seamen's Hospital Society, Fellow of King's College, London.

The "Report of the Commission on the Nature, Pathology, Causation and Prevention of Dysentery and its Relationship to Enteric Fever, appointed by the Secretary of State for War, August, 1900," has just been published, and merits close attention. The members of the Commission, viz., Colonel J. Lane Notter, R.A.M.C., Lt.-Col. David Bruce, R.A.M.C., and Professor W. J. Simpson, met at Capetown in September, 1900. It was decided that to Colonel Bruce should be allotted the laboratory work, whilst Colonel Notter and Professor Simpson should inspect the camps and water supply. The above report embraces the results of this investigation.

In the first part of the report the bacteriology and pathology of South African dysentery are considered, together with its relationship to enteric. The laboratory was established at Pretoria, and the amount of work entailed can be gathered from the fact that owing to the military exigencies present at the time, the dysentery cases could not be brought to the particular hospital set apart for them, but were distributed wherever was most convenient. Thus Colonel Bruce would be forced to journey often four miles with his instruments to obtain specimens in an extremely hot stuffy tent. Notwithstanding these adverse conditions, he has given us an extremely lucid report, illustrated by beautifully coloured plates. The work comprised the following points: A daily note of the symptoms, temperature, evacuations and examination of the blood; the examination microscopically for amœbæ or any other organism, and the cultivation and separation of the different bacteria; and serum sedimentation tests. The *post-mortem* examinations are also described, and the methods employed for making cultivations from the various organs, blood, bile and intestinal contents. It will thus be seen that this part of the work of the Commission was thoroughly carried out, and the conclusions arrived at by Colonel Bruce are to the effect that dysentery in South Africa is not caused by amœbæ; that the organs in dysentery are absolutely sterile; that it is a local disease attacking the large intestine, the causal agent confining itself to the latter; that no particular species of micro-organism could be said to play any prominent part in its production; that there was not sufficient evidence that organisms of the coli group take on pathogenic properties; that there was no connection between dysentery and enteric; and that it is possible that the so-called cases of dysentery following enteric, were relapses of enteric where the disease had attacked the large intestine. Bruce did not find any deviation from the normal as regards the corpuscles of the blood, and apparently does not place much reliance on the sedimentation test.

The second part of the report is contributed by Professor Simpson. He first considers the prevalence of dysentery and enteric amongst the civil population of Cape Colony and Natal, and shows how there are few places free from either, at certain seasons of the year. Thus it was absolutely certain that these diseases, especially enteric, would affect our advancing army and be carried with it. How great was the incidence is shown by the following table:—

	Period	Admission	Death	Percentage of Deaths to Admission
For dysentery	1st year	11,143	546	4·9
	2nd year	13,131	427	3·2
For enteric fever	1st year	15.655	3,647	23·2
	2nd year	15,463	2,530	16·3

It will be noticed that the dysentery was not accompanied by the usual fatality of the disease which is manifested when it attacks armies in the field. The excellent food arrangement accounts for this. As to the causation of the attacks the most frequent is adjudged to have been the drinking of the impure surface waters, of the unfiltered river water polluted with decomposing animal matter, the sand lodged on the food during dust storms, irregularity as to diet, wet,

chill, &c. The diseases as they occurred at Modder River are then described, and it is shown that both dysentery and enteric were prevalent in the Modder River army before any portion of it started for the relief of Kimberley or in pursuit of Cronje, and that the part of Lord Roberts's Army concentrating at Modder River, incurred considerable risk of infection. With regard to the Bloemfontein outbreak of dysentery and enteric it is pointed out that the army, previously subjected to much privation and fatigue, a portion being also infected with dysentery and enteric, arrived at that town on March 13th and encamped there. Shortly afterwards the recently introduced filtered water was cut off by the enemy, and our troops had to drink the former insufficient and condemned supply, rendered still more dangerous by the surface pollutions due to their encampment. This resulted in the occurrence of 526 cases of dysentery and 4,280 cases of enteric fever and simple continued fever (which latter term certainly would contain many cases of enteric) between April 6th and May 25th.

In the next chapter of the report, these diseases as they affected Pretoria are considered, and here again the bad influence of polluted water is evident. At Pretoria experiments were made as to the possibility of flies contaminating food, resulting in positive proof that the milk was thus infected. With regard to the dysentery and typhoid amongst British prisoners at Waterval, our men were located in sheds, which were flooded during the rains, the flood water from the hill above the sheds bringing with it the refuse from the heaps above the camp on its way to the river below. The water supply was pumped up from the river thus polluted into tanks in the camp, and as the banks of the river were used as latrines by the Boer guard, the drinking water was still further fouled. Again, the latrine trenches of the camp were only a short distance from the sheds; they were flooded during the heavy rains, and their contents mingled with the surface drainage of the camp down the hill into the drinking water. Such conditions were bound to cause disease. In Pretoria there had been a few cases of enteric amongst the prisoners, and the infection was carried with the prisoners to Waterval. During the five and a half months the men were encamped at Waterval, there were 294 cases of enteric, and 122 cases of dysentery, with 46 deaths from the former and 4 from the latter. These two diseases became very rife in January, and Dr. Haylett reported the matter to his chief, Dr. Veale, who took no active measures to mitigate the state of affairs. On this Dr. Haylett very properly resigned, and Dr. von Gernet came in his place. This gentleman, as the result of his inspection, went straight to the President of the Committee, and detailed the horribly insanitary state in which our unfortunate men were living. As the result of this communication Dr. Veale's connection with the hospital ceased and Dr. von Gernet was placed in sole charge. Improvements in the camp were immediately inaugurated, and better and more ample food provided. The humane efforts of Dr. von Gernet were referred to by Lord Roberts in eulogistic terms in his despatch to the Secretary of State for War.

With regard to the question of the drinking water, Professor Simpson states that the most conspicuous sanitary defect in the campaign was its impurity, due partly to want of knowledge of the principles of purification, and in many cases to a want of appliances. He states that he saw guards placed on water quite potable, but that he never saw guards placed on water that ought never to have been drunk. To this statement Colonel Notter replies by pointing out that the onerous duties of the men elsewhere prevented their being so placed. But surely this is no answer, for these onerous duties did not prevent them being located over water quite potable, as is stated by Professor Simpson to have occurred. Simpson also drew attention to the many instances in which good water at its source was defiled, and according to his experience it was "the general exception for the water to be filtered or boiled." Colonel Notter, however, does not agree with this. Regarding the means taken for purifying the water, Ladysmith showed us a bright example in this as in its glorious siege. The water from the Klip River was muddy and contaminated, but use was made of the wood ash waste from the cook-houses to employ it as material preliminary to the filtering. This ash most effectually cleared the water and rendered it fit for the Berkfeld filter. Again the arrangements employed in the Liverpool regiment were admirable. Here two or three men were told off to look after the filters, who on arrival in camp sought out a water supply, and devoted their whole attention to filtering it, without having any other duties to perform. At Maritzburg a Macche's steriliser was in use.

In Appendix VII. another admirable plan carried out at Ladysmith is described. Here six tanks were erected; by means of steam brought in pipes obtained from the traction engines for the electric light dynamos to light the camp at night, the water was sterilised; the water was then allowed to cool, and the mud precipitated by alum; it was then drawn off into a service main and distributed to different parts of the camp. Boring for water was also resorted to in a large number of camps, and was found to have distinct advantages in the freedom from surface contamination, natural filtration, and larger quantity obtainable. With regard to the health organisation of an Army in the field, Professor Simpson proposes that the R.A.M.C. should consist of two branches—(*a*) the medical branch, (*b*) the health branch. This latter should include also some selected officers of the Royal Engineers. This Conjoint Corps is, however, held by Colonel Notter to be quite impracticable. On the contrary, however, it would seem to be an eminently practical factor in the prevention of disease in a campaign. The sanitary engineers would be especially trained, and surely such a combination of the two scientific branches of the Army must work for good.

In conclusion we fear but scant justice has been done in this review of this admirable Blue book, which contains an enormous amount of work for future guidance, and which deserves a careful perusal and study of its contents.

Correspondence.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—In reference to my remarks on "Varioloid Varicella in Trinidad," published in the issue of the JOURNAL OF TROPICAL MEDICINE, September 1st, 1903, I am stated to have said that I actually saw the cases in question in Trinidad. I should like to correct this impression and substitute the following:—

"Dr. Low said he had seen similar cases in Barbados, and he had no doubt they were small-pox. The Trinidad epidemic resembled that epidemic in many ways, and he thought that there was now little doubt but that it was also small-pox."

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Dysentery.

THE SUCCESSFUL TREATMENT OF SPORADIC DYSENTERY BY APLOPAPPUS BAYLAHUEN, by Wm. Fingland, L.R.C.P. and S.Edin. *Lancet*, August 15th, 1903.—In cases of "sporadic dysentery, colitis, or one of its protean forms," Dr. Fingland recommends the use of "hysteronica." This preparation is obtained from the Aplopappus Baylahuen, indigenous to South America. Messrs. Parke, Davis and Co., of London, have prepared a fluid extract of the plant, which is given in 20 minim doses thrice daily, suspended in a tablespoonful of cream, milk, or freshly prepared almond emulsion. The accompanying diet should consist of beef, mutton, fish and light farinaceous dishes, with hot water and milk to drink, the latter with some caution.

Elephantiasis Scroti.

ELEPHANTIASIS OF THE SCROTUM IN UGANDA, by Ralph Stoney, Medical Officer, Uganda Protectorate. *Brit. Med. Journal*, August 15th, 1903.—Dr. Stoney records a case of elephantiasis in Uganda in which he operated successfully under considerable difficulties.

Leprosy.

LEPROSY AND ITS TREATMENT BY CHAULMOOGRA OIL, by R. Sinclair Black, M.D., Medical Superintendent, Robben Island. *South African Medical Record*, June 15th, 1903.—Dr. Black states that the number of drugs which have been used in the treatment of leprosy almost embraces the whole pharmacopœia. We have tried many drugs at the Leper Hospital in Robben Island, "but the only only one from which any special benefit has been noted is chaulmoogra oil.

"So far as I have observed, its action is as follows: (1) It acts as a general tonic, improving the whole nutrition. (2) It has a specific effect on the nutrition of the skin and on the naso-pharyngeal and bronchial mucous membranes. There can be no doubt that it has a marked effect in modifying bronchial affections, and I attribute a considerable percentage of the fall in our death-rate from chest diseases to it. No doubt the gynocardic acid plays a large part in this, but it is not the only agent. I got Burroughs, Wellcome and Co. to send me sufficient tabloids of gynocardic acid to make a thorough trial on two suitable tubercular cases, and, though there was some improvement, it was not nearly so marked as with the pure oil. Which other constituent it is that aids in producing the beneficial effect I am not prepared to say yet. I am at present experimenting with a pure crystalline fatty acid and a mixture of fatty acids obtained from the oil, senttome by Burroughs, Wellcome and Co., but, at any rate, I would not hesitate to recommend the employment of the oil in preference to pure gynocardic acid. The mode of administration varies. With those patients who cannot take it in the usual form I begin with one five-minim capsule three times daily, gradually increasing to twenty capsules three times daily, the maximum dose being, roughly, a drachm and a half three times daily. For the less sensitive patients I dilute the oil one half with pure olive oil, and of this they take a dessert to a tablespoonful three times daily after meals. I do not think less than a drachm three times daily is of any benefit, and if it can be borne the dose should be doubled. I have also administered it subcutaneously with benefit, giving as much as 20 cc. at a time of the mixture, with olive oil. In hundreds of such injections I have never had an abscess or any other bad result, and this method might be adopted whenever neither capsules nor oil can be borne.

"From my experience here I would recommend a practitioner who had a patient privately segregated to carry out the following routine, viz., disinfection twice daily of the nasal cavities with an antiseptic solution used with a douche. The use for the troublesome blocking up of the nostrils some such snuff as this:—

℞	Cocaine hydrochlor.	½ gr.
	Menthol	2 ,,
	Boracic acid	60 ,,
	Bismuth subnit.	120 ,,

Dr. Black does not claim that the oil cures, but it improves the general condition and makes the patient more hopeful and contented.

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5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—OCTOBER 1st, 1903.

Original Communications.

NOTES ON COLLECTING MOSQUITOES.

By Herbert E. Durham.

Beri-beri Commission of the London School of Tropical Medicine.

The entomologist prefers to have the insects pinned and dried. The dorsal surface being of chief value, the mounting should be done so that this aspect is exposed; duplicate specimens may be mounted to show the sides, &c. Since I have met with people who are not acquainted with the pamphlet of instructions which is issued by the British Museum, a word or two may be said on the mode of pinning.

Pinning Mosquitoes.

Discs of white cardboard are used; these are of use not only for protecting the insect, but also for recording the date and place of capture, the necessary writing being done *on the opposite side to that upon which the insect is mounted.* The standard size of disc is ⅝ inch (No. 20 gun-wad punch, or 1·6 cm.). The writing having been performed, a No. 20 entomological pin is thrust through the centre of the card so that it projects some two-thirds of its length. This, as in fact all pinning, is best done upon a piece of *pith* (cork or cork carpet is generally recommended). With the aid of a hand lens the point of the pin is easily directed between the legs of the insect as it lies on its back. At this stage the pin need not be made to penetrate more than enough to pick up the insect, when, with the aid of a pair of fine-pointed forceps, it is cautiously straightened and pressed down till the pin just projects through the centre of the dorsal surface of the thorax. *Great care must be taken not to rub off any of the scales in doing this.* Next with the aid of a No. 20 pin, mounted on a wooden match, the legs are extended somewhat, if they are contracted together. The pin is then cautiously withdrawn through the card until the abdomen rests upon the card; a final arrangement of the legs may be advisable. An ordinary pin is thrust through the disc near to its edge, *by the hind end of the insect* (fig. 1), whereby the disc and its burden may be fixed to a cork; the projecting part of the fine pin may be nipped off with a pair of scissors. The jarring and shaking of transit is apt to loosen the hold of the card upon the common pin, to obviate which the *under side* of the disc is touched with a tiny drop of a solution of shellac or sealing wax in spirit at the pin puncture; it is not necessary to cement the fine pin also.

Storing and Packing Pinned Insects for Transmission by Post, &c.

The following device has stood the test of the post, and also the jarring of passage on and handling of heavy baggage in the hold of a cargo steamer, from the Malay States to England (see fig. 1).

Requisites: a tin box such as a ¼ lb. tobacco tin, or for a smaller number of insects a tin such as those in which toothpowder is frequently sold, a few ordinary pins, a few ordinary bottle corks, a little naphthalene, or, failing that, camphor, and some cotton wool. In order to adapt these objects to their purpose, a disc of rigid material which will just slip easily into the tin is needed, the most suitable material, which, moreover, is ready cut to the hand, is the disc of thin tinplate with which tobacco tins are hermetically sealed; cardboard is not so satisfactory. Three small holes are punched near the centre of the disc, and a cork is fixed end on by running pins obliquely into it through the disc; a second cork may be fixed similarly on to the first cork and sliced off if necessary, so that when placed inside the box the cork column *very nearly* reaches the lid, to allow room for the cotton wool buffer.

The pins bearing the mounted insects are then thrust radially into the cork column to a sufficient depth for a firm hold (one set was cemented with shellac, but this is not necessary), the cork column and disc being held axially between finger and thumb during the process.

In order to pack and preserve the insects a small piece of naphthalene is warmed in the tin over a

lamp or candle until it is molten. When cooled a circular cut "buffer" or a layer of cotton wool is put down to the bottom of the tin; this helps to save jarring, and also prevents the naphthalene from getting loose. Lastly, the "bobbin" of mounted insects is introduced, disc first, and the lid tied down. The whole may be put in a cardboard box for outer packing with tow or shavings and transmitted through the post. Naturally the same device may be used for larger insects either by using a wider tin or by placing the cork column eccentrically. In small tins the cork may be fixed upon a nail or pin which is soldered in the centre of the lid.

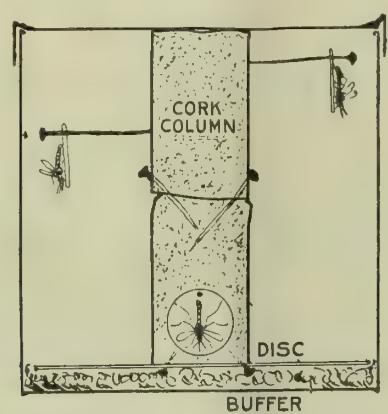

Fig. 1.—Diagram of device for packing pinned insects.

Another Mode of Preserving the Insects.

It not infrequently happens in the Tropics that neither time nor opportunity is available for pinning, usually, moreover, such are occasions when new or rare kinds are forwarded; this has been the case with many of the insects I have collected and which Mr. Theobald has identified as new species.

Requisites: Small tin boxes of stamped-out metal, about one inch in diameter (such as are often used for lip salve, &c.); discs of tissue paper cut to fit (a number are readily cut at a time by pressing many-times-folded tissue paper upon the end of a box and cutting along the mark with scissors); cotton wool (preferably tainted by a *trace* of clove oil, a most efficient preventer of moulds) and naphthalene.

As above described the box is prepared by melting a little naphthelene in it; one or two discs of paper are then put in; upon this are placed one or two mosquitoes; the place and time of capture are written upon another disc which is dropped upon the insects. It is preferable to place the insects in dorsi-ventral position for facilitating subsequent mounting. More mosquitoes, each covered with a disc, are inserted. Finally a pledget of cotton wool is placed on the top and the lid adjusted and labelled. It should be noted that there should only be enough pressure exerted by the wool to prevent slipping—too much pressure will flatten the insects.

A similar mode is the best way of packing butterflies, larger tins being used, they are thus very safe from insect pests, moulds and injury; moreover the mode is neater than the orthodox paper envelopes, as well as affording better protection.

("Tooth-powder boxes" of various sizes may be obtained from Messrs. Kettle, 9, New Oxford Street, London.)

Collecting Larvæ and Pupæ.

By far the most useful instrument for dealing with the aquatic stages is a spoon made of wire gauze; nickel wire gauze is best, as it does not rust. An oval piece is cut out according to the size of the spoon required, the *long axis of the spoon being diagonal to the gauze*; by means of finger pressure it is readily moulded. A piece of stout wire is fixed as a handle with a little pewter solder. It is preferable to bind the free edge with thin metal foil fixed here and there with a trace of solder (tinfoil, and a little zinc chloride as a flux, is a handy solder substitute), especially if the spoon is carried about in the pocket; anyhow, it is well to fix the edge here and there with solder to prevent unravelling.

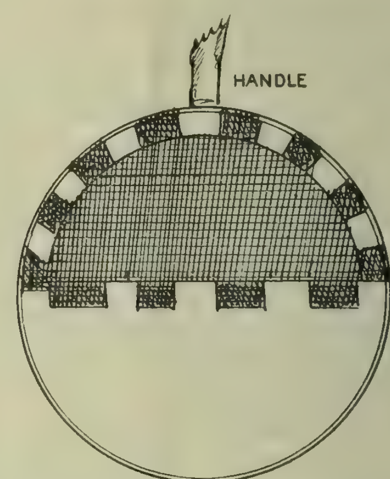

Fig. 2.—Bottom of tin arranged as a metal net.

With such a spoon and a few specimen tubes one is equipped but not encumbered for a morning ramble, in case any larvæ should be found. When a more definite mosquito hunt is to be made the following form of net is very useful, and, as I think, better than muslin nets.

A more or less semicircular piece is cut out of the bottom of a tin box (fig. 2), (a tin about 2 inches deep and $3\frac{1}{2}$ to 4 inches in diameter is suitable). As seen in the figure, a number of snips or "cramps" are cut about $\frac{3}{8}$ inch deep; alternate "cramps" are turned down, a piece of wire gauze cut correspondingly is laid in and the bent "cramp" closed down with a hammer or handy piece of wood (the end of the leg of an upturned chair will make an anvil for this manipulation). A stick for a handle is attached by a perforation or socket, which should be on *the same side as the gauze*.

The mode of causing larvæ, when caught, to betake themselves to the water retained in the intact part of the tin need hardly be described. They are then scooped out with the gauze spoon and placed

a bottle or tin for the homeward journey. The first form I made of this net consisted of two tins, the one with a bottom entirely of gauze, the other being rather larger and used for immersion of the first. However, the combined form is better.

Naturally such nets may also be used as filters for pouring in water which is baled out of a pool, if the direct netting process is contraindicated. Such wire nets are cleanlier than those made of textile material, and give no likelihood of mixing takes from different pools.

Bred Insects.

Insects which are bred in captivity should be kept alive for at least two days before they are killed for preservation, if this is not done they shrink up and wither to a dreadful extent.

When possible larvæ and pupæ should be preserved as well as the adult insects, for it is very necessary that the *identity of the kind in its different stages should be beyond impeachment.* At the present time the life histories of the different species are more wanted than the adult insects alone; therefore in any case the whole series from egg to adult should be kept. Larvæ, &c. may be preserved in formalin (5 per cent.) or in spirit.

MALARIAL FEVERS IN WEST AFRICA.

Being some Remarks on the Malarial Fevers of the West Coast of Africa, made before the Sierra Leone Medico-Chirurgical Society, May 29, 1903.

By Major R. Crofts, D.S.O., R.A.M.C.

In this paper I not only relate some of my own experiences of the malarial fevers of the West Coast of Africa, but I also bring before you some observations made by medical officers who worked on this Coast for science and their country long before any member of this Society was born.

I have remarked for a considerable number of years now that whilst the investigation into the cause and prevention of malarial fevers has been very active, and deservedly so, comparatively little attention has been given to the cure of these fevers, to their complications, and to the causes of death in the remittent fever of the West Coast of Africa. The treatment of remittent fever and its complications is by no means an easy matter; great care and experience are necessary if the physician wishes to be even moderately successful.

I shall here deal principally with the treatment of remittent fever and its complications, but I shall, before doing so, give you a few quotations from the writings of former Army Medical Officers serving on the Coast, and make some remarks myself which may be useful to intending residents on the Coast.

Assistant-Surg. J. Bell, R.A.C.C., writing in 1825, thus describes the remittent fever of the Coast: "In the incipient stage of remittent fever the patient complains of pain down the vertebral canal, extending across the lumbar region and in the direction of the cauda equina, which prevents him from turning in bed without agonising sufferings general position on the back, great lethargy and sense of heaviness, headache and vomiting, distressing symptoms, and on the accession of a paroxysm a large quantity of vitiated bile is ejected. Pain on pressing the right and left hypochondriac regions often unbearable. Urine high-coloured and scanty, tongue furred deeply, and presenting different colours, sometimes yellow, at other times it changes from white to brown, and in the acme of exacerbation it got as dry as a chip; remission only known by the moisture of the tongue and secretion of saliva returning. A nasty brown crust in the fatal cases collected about the teeth of a gluey nature, and difficult to be removed. Debility on the first day of attack was great and increased in spite of all efforts to overcome it. The exacerbations mostly occurred about mid-day and the remissions towards morning: on the fourth and fifth day a very deep yellowness of the skin appeared which always predicted a fatal issue this year."

The treatment consisted of "bleeding, purging, blisters, diaphoretics and mercury, with many auxiliaries. The mercurial treatment was most commonly adopted, and certainly saved many from the pains of death, but alas! several of those who recovered had such ruined constitutions, that they wasted away slowly, until life became extinct. Bark I administered in the period of remission, but could not discover any particular benefit from it. Carbonate of ammonia was highly serviceable in allaying gastric irritability and determining to the skin: this medicine I consider a most powerful febrifuge." I would ask you to observe two points very carefully in the above report—one is the fact noted that "debility" in the first day of the attack was great, and the other, "this medicine" ("carbonate of ammonia") I consider a most powerful febrifuge. I shall again call your attention to these points.

D.I. Hosp. Barry writes in 1826: "A series of unprecedented calamities have nearly overwhelmed those unfortunate settlements and afforded but too certain proofs of the destructive effects of this climate on exotic constitutions. Our miseries have, however, been adventitiously increased by the arrival of a large body of European soldiers culled with no fastidious hand from the very dregs of the Army, and augmented, as deaths had thinned their ranks, by fresh importations of the same material. Riot and debauchery marked their footsteps, but riot and debauchery could not be proved so immediately destructive to their votaries, had they not pursued their vicious career in a climate whose fatal effects the most guarded, the most regular and abstemious have not been able to withstand."

The same officer gives the following "return of a detachment of recruits R.A.C.C. landed at the Isles de Los on February 23rd, 1825. Strength, 108; died between June 2, 1825, and December 20, 1826, 48; invalided to England, 21; fit for duty, 10. Present unfit for duty on account of venereal disease, 29."

To give you an idea of the appalling death-rate in the early part of the nineteenth century in the colony, I add the following table showing the deaths of Euro-

pean soldiers in Sierra Leone during the month of July, 1826:—

1st	..	None.	17th	..	3.
2nd	..	None.	18th	..	3.
3rd	..	None.	19th	..	3.
4th	..	None.	20th	..	3.
5th	..	None.	21st	..	6.
6th	..	None.	22nd	..	3.
7th	..	None.	23rd	..	4.
8th	..	2.	24th	..	2.
9th	..	None.	25th	..	2.
10th	..	2.	26th	..	None.
11th	..	1.	27th	..	1.
12th	..	4.	28th	..	3.
13th	..	1.	29th	..	2.
14th	..	3.	30th	..	None.
15th	..	1.	31st	..	2.
16th	..	1.			

Fifty-three deaths in one month from remittent fever! I have taken no account of the deaths from other causes during that month. In the same period three European officers died.

From the above you will readily grasp how Sierra Leone came to be called the "White Man's Grave."

Ague is not very prevalent on the Coast; it bears but a small proportion to the number of cases of remittent fever. The cases are generally of an ill-defined character, and the cold stage is rare. The quotidian and tertian varieties are the most common; I have never seen a case of quartan ague on the Coast. Though cases of chronic enlargement of the spleen occur they are rare.

The ordinary cases of ague quickly yield to dieting, diaphoretics, quinine and arsenic, the administration of which will be described in detail under remittent fever.

Remittent Fever.—This is beyond all others the most important disease in West Africa, and the one with which the medical officer is brought most frequently in contact.

Predisposing Causes.—Youths and elderly people are far more susceptible to the influence of malaria than others. No European ought to be sent to West Africa until he is at least 26 years old. Sir William Aitkin has clearly demonstrated that the process of growth is not completed until that age is reached, and experience has taught me that Europeans under that age do especially badly in West Africa. I have known young Europeans of under 20 years old on the Coast. They almost invariably quickly run down in health, and in a short time have to be invalided. Men will but rarely stand the Coast after 50 years of age.

Sex.—As a rule European women are more susceptible to West African remittent fever than men.

Idiosyncrasy has great influence in determining the liability of persons to remittent fever. Of a number of persons living under similar conditions, some are continually getting attacked, while others practically escape.

People of fair complexion and light-coloured hair stand the climate best; the red-haired get less remittent fever than any others. Hundreds of young Europeans come to the Coast every year now, and if those who engage them only kept the above fact before them they would save themselves much trouble and expense. It would be very interesting if one of the large firms engaged only men with red hair and blue eyes—not brown eyes, as such people are so prone to hæmorrhages—for a few years. I am sure it would repay them to do so.

The youth who is brought up in the East Indies does very badly in West Africa as a rule. Occupation has much to do with the liability of individuals to attacks of remittent fever. There is no doubt that regular daily employment is beneficial to health in West Africa as elsewhere, but no European can continue for any length of time in works that expose him to the sun, at least between the hours of 9 a.m. and 4.30 p.m. If thus exposed he quickly runs down in health, shows marked signs of malarial cachexia, and is almost certain to get attacked by remittent fever.

It is necessary to take a greater amount of rest in West Africa than in better climates.

Food.—The ordinary Englishman on the West Coast seems to have but little idea of the proper use of meat; as a rule he eats three large meat meals daily, and in addition he has two other meals of tea with hot toast and butter, one in the early morning and the other in the afternoon. One man eats enough nitrogenous food for three, and as a consequence in a short time he gets dyspeptic from the enormous amount of unnecessary work thrown upon his digestive organs, gets run down in health, and thus renders himself more liable to remittent fever. The Irish and Scotch do not as a rule make this mistake. We were never used to meat more than once daily. Thank God, our parents could not afford any more.

As to the use of alcohol in West Africa and its effect on the health much might be written. During a long residence on the Coast I have known all sorts of men—total abstainers, moderate drinkers, occasional drunkards and habitual drunkards. I have no prejudice whatever either for or against alcohol.

The total abstainer on this coast does badly. No alcoholic drinks should be taken before sundown. The morning drinker is a most pernicious man, and the mid-day drinker is but little better—they do harm to their health and injure others by their example. But there is no doubt that when the day's work is done, when the individual feels that evening exhaustion which seems inseparable from the West Coast of Africa, a little alcohol either with or after his dinner is not only pleasant and desirable, but absolutely necessary. Any privation which runs down the health renders one more liable to an attack of remittent fever; and this affords no exemption to another attack, but rather renders the individual more liable to its repetition.

Night air is a regular bugbear on the Coast. People come here with the most extraordinary idea of its injurious effects. They close up their windows and doors in their quarters, breathe an impure atmosphere for half their lives, and still expect to be in good health. Admitting that a clear distinction should be made between draught and ventilation, and that the former should be avoided, still it is absolutely necessary for the preservation of health in West Africa that our quarters should have good ventilation, not only by

day but also at night. It is very easy to have too little air, but one can scarcely have too much. Avoid draught, and night air will do no harm.

A man may get an attack of remittent fever in twenty-four hours after his arrival on the West Coast, but the period in which he gets his first attack is generally from six weeks to three months. There is rarely any shivering before an attack of remittent fever. The first symptom is almost invariably a pain across the loins. This is as constant in remittent fever as in small-pox, but it is generally not so severe in the former. Soon there is a feeling of soreness in the lower extremities and hands; the frontal headache, accompanied with nausea, quickly leading to vomiting. The pulse is almost 100 per minute; temperature from 100° F. to 104° F., or even higher; tongue clean; skin dry; face anxious. Now what is to be done? The first thing is to attack the vomiting. On the proper treatment of this depends in many cases the duration and severity of the fever and the success of the treatment. I have seen patients constantly vomiting or trying to vomit for hours. I have been in a very weak condition myself from constant and repeated attempts to vomit; but I found that all this was unnecessary and easily stopped. The effort depends not only upon the nervous effects produced by the malarial poison, but is due more to the irritating local effects of the undigested food, gastric juice, saliva, &c., in the stomach.

Drugs such as bismuth and opium administered with the idea of diminishing the irritability of the stomach do no good, but are rather aggravating. The vomiting is an effort of Nature to get rid of the irritable contents of the stomach, and the duty of the physician is to assist Nature and not to impede its action. A dirty stomach ought to be cleaned in the same way as a dirty face, by washing it with water. Let a patient in the above condition drink half a pint of cold or lukewarm water; he has scarcely swallowed it when up it comes with the glairy, sticky contents of the stomach which he has been vainly trying to vomit. This process should be repeated three or four times until the water comes back almost as pure as when swallowed. With the last half-pint of water swallowed the patient may have to irritate his throat with his finger to produce vomiting. The patient in a few minutes finds the intense sickly frontal headache nearly disappear with a cessation of the nausea and attempt to vomit. His temperature rarely runs so high as it would do if this treatment is omitted; it is easier to produce diaphoresis, the stomach retains the diaphoretic, and in a short time the patient can take and retain appropriate nourishment. It is rarely necessary to repeat this treatment, except in very severe cases or where it has been omitted at the outset, but when necessary do repeat it. It always produces great relief. There is but one drug that I am aware of which is valuable in allaying irritability of the stomach in the severer forms of remittent fever, and that is liq. hydrarg. perchlor. Of course nausea and vomiting are not always present in cases of remittent fever, but they generally are. Before giving a diaphoretic ascertain if the bowels are acting freely. It is not enough to ask the patient if his bowels are regular if they act every second or third day, while others look upon themselves as constipated with bowels acting twice daily. In every case in which it is permissible (and in every case except where there is diarrhœa and dysentery it *is* permissible) give a purgative with the diaphoretic.

The Best Diaphoretic and Purgative.

The two most valuable diaphoretics in these cases are, beyond question, antipyrin and antifebrin. From a large experience in the use of these drugs I have come to the conclusion that the latter is unquestionably the more valuable of the two. With antifebrin diaphoresis is produced more quickly, and the diaphoretic effect is much more prolonged than with antipyrin. I never saw any ill-effects produced upon the heart by the administration of antifebrin. The dose should be gr. v. The purgative to be given should be calomel, dose gr. v. to gr. x. There is no other purgative medicine that can compare with it in remittent fever. It seems to have almost a specific action and should be given in every uncomplicated case. Mix the calomel and antifebrin together, place them on the back of the tongue, and let the patient swallow them with a little water, when he will retain them if he has been treated as above for the nausea or vomiting, otherwise he will very likely reject them.

At the first visit the patient's urine should be examined for albumen and bile, also the lungs should be examined to make sure that the case is not one of pneumonia. Where one is accustomed to see many cases of remittent fever daily one is apt, if not very careful, to mistake a case of commencing pneumonia for remittent fever.

No Opium.

I would enter the strongest protest against the use of opium or any of its preparations. This is a point that is well understood by the old Coast physicians. Opium has the most deadly and pernicious effect; it will convert a simple case into a complicated one, and make a severe case still worse.

The functions of the kidneys are always more or less interfered with in this fever. There is invariably some congestion of those organs, and only too frequently inflammation, and opium has a lamentable effect upon their condition. If called to see a case in which opium has been administered I always take a grave view of it. Young physicians not aware of the action of opium in these cases are frequently led to give it to allay irritability of the stomach, or often at the urgent request of the patient a sleeping draught. There is only one class of cases in which opium is admissible, and that is when the fever is accompanied with profuse diarrhœa or dysentery, and where other means have failed to stay these disorders.

Quinine and Arsenic.

The opinions in West Africa as to the value and proper dose of quinine are many and conflicting. Having used it for the past eighteen years in the treatment of this disease, I have come to the conclusion that it is an undoubtedly valuable drug. I have tried it in small, moderate, and large doses, administered in various ways at all times during the course of the fever, and at various times of the day.

That it is a specific, that unaided it will cure every case, there is doubt; indeed in some epidemics, if trusted to alone, the absence of every apparent good effect is calculated almost to make one lose faith in it. The amount of quinine to be given is of very great importance. Having used it in many thousands of cases, and in various amounts, I have come to the conclusion that all the good that is in quinine can be obtained from 15 grains daily. There is no advantage in the administration of large doses. A temperature not affected by 15 grains daily may not be effected by even 80 grains daily, or any intermediate amount. On the other hand, the patient's condition is aggravated by huge doses of quinine. All the symptoms of cinchonism are produced, and the patient's debilitated condition rendered still more profound, what little digestive capabilities he has left are diminished, and he becomes anxious, watchful and sleepless.

Arsenic is a drug of incalculable value in treatment of the Coast fever, and should be given in every case where there is not diarrhœa and dysentery. It is far superior to quinine as a curative agent, and if I were only allowed one of these drugs in the treatment of my cases I should certainly choose arsenic. The patient should be put under the influence of arsenic as quickly as possible, giving it every four hours, and in urgent cases every two hours. The best is liq. arsenicalis. It should be remembered that arsenic is a cumulative drug, so to get a constant effect the dose should be at first a large one, and then gradually diminished. The patient should have at first ♏ 30 of the liq. arsenicalis per diem divided into appropriate doses. In ordinary cases of remittent fever the antifebrin may have to be repeated every evening for two or three evenings, as there is an almost constant evening rise of temperature. Treated as above, all ordinary cases of West African remittent fever will quickly recover. The diet should consist entirely of milk with soda water, and beef tea or chicken broth.

The most important complications of remittent fever are high temperature, and hyperpyrexia, albuminuria, hæmaturia, hæmoglobinuria, cardiac clot, jaundice, serous effusion into cavities of brain, parotitis and purpura.

High Temperature and Hyperpyrexia.—It may be laid down as a rule in cases of West African remittent fever that they assume a serious aspect when the temperature rises to 105° F. or higher. For instance, a case with a temperature of 105·5° F. is of much graver import than a case with a temperature of 104·5° F., more so than the difference of 1° F. would seem to warrant. Should the patient have a high temperature, when I first see him I now always adopt the same treatment, sponging down with cold water. When his skin gets cold and no more heat can be abstracted from it he is dried, put to bed, and when his skin gets hot, in about twenty minutes, he is given the diaphoretics as above. One important fact that we should all remember is that "patients with fever do not catch cold," and another is that no matter how weak a patient is, no matter how feeble his heart, he can stand sponging with cold water much better than a continued high temperature.

Just one case to show the benefit of this treatment. In proceeding with a detachment of three officers and 100 men of the West India Regiment from Sierra Leone to Lagos, in 1892, to take part in the Jebu expedition, two of the officers were attacked with remittent fever on board ship. One of the cases was very severe and protracted. It was treated carefully, but the temperature went on daily from 102° F. to 104° F. After diaphoresis it would fall to 102° F., but quickly rise again. The patient (naturally of a fragile constitution) got gradually weaker, and arrived at a stage when antipyrin (I was then using this drug) had no effect. About eight days after the commencement of the fever his temperature rapidly rose to 107·6° F., he was lying entirely unconscious with muttering delirium, and that peculiar grave "gallop" in the pulse where one beat seems to run into another; respirations quick and shallow. He was to all appearance dying. I at once began sponging him with cold water, using it plentifully. The effect was striking; the patient gradually began to regain consciousness, and to protest against his treatment; pulse slower, more regular, and stronger, respirations slower and deeper. In one hour his temperature had fallen to 101·6° F.; he was then packed in sheets wrung out of cold water. His temperature remained steadily at 101·6° F. for twenty-four hours, and then it fell gradually to normal. He made complete recovery. This is but one of many similar cases I have seen.

Albuminuria.—In all cases of West African remittent fever the urine should be examined. It is astonishing how often it will be found to contain albumen. It is of course of the greatest importance to recognise this at once. The albumen will generally disappear on the cessation of the fever, but sometimes results in chronic Bright's disease; the latter, however, is infrequent. The albumen is probably due in the majority of cases to the pressure in the renal capillaries, or the exuding of the serum through the capillary walls. Locally hot fomentations will be found useful; the bowels should be kept well open. It must be remembered that the condition is due to malaria, and the most appropriate medicines are therefore quinine and arsenic; a little digitalis may be desirable, but no preparation of opium should be given, or the condition will be aggravated. During convalescence iron in conjunction with quinine will be valuable.

Cardiac Clot.—This of all others is the most frequent cause of death in West Africa, and it is a cause which is not sufficiently recognised. It is quite a common thing for cases to terminate fatally at temperatures varying from subnormal to 100° F. These deaths are nearly always attributed to exhaustion, but if a *post-mortem* examination is made, *anti-mortem* cardiac clots will in the great majority of cases be found not only in the ventricles but intertwined among the valves. There is no mistaking the hard, pale *anti-mortem* clot for a *post-mortem* one. I look upon the discovery of these clots as the most important one that has been made in the history of remittent fever. If the formation of these clots could be prevented (and their formation can be prevented in the great majority of cases) the chief danger of West African remittent fever would be

removed, and the success of a physician in treating his cases depends to a large extent on his taking precautions to this end.

For some years past I have asked every young physician who has come under my command on his arrival in this country to tell me the causes of death in remittent fever; not in one instance did they mention the most prevalent cause of all. The formation of the clot is favoured by two causes—the increase of the elements of fibrin in the blood, and the weak cardiac action. Then the indication is clear—diminish the elements of fibrin in the blood and sustain the cardiac action.

The first object is attained by the administration of carbonate of ammonia; it should be given in all cases when the heart shows signs of failure. This is the most important item in the treatment of remittent fever. The heart's action should be sustained by stimulants and proper diet, given at frequent intervals. The patient must be fed; if you cannot feed him by the mouth feed him through the rectum, and see the feeding done yourself. Of medicinal stimulants the best are spt. ammon. aromat. and camphor. As to the administration of alcohol, it must be remembered that generally we are dealing with patients whose strength has been run down by residence on the Coast, hence they require alcohol early. Some may require it on the first day, some on the second or third; but all cases of any severity do require it. It is almost useless to try to treat the cases without. All fevers must be fed, and this is particularly true of the Coast remittent fever.

Gentlemen, I had intended making a few observations on the other complications of remittent fever, but this paper has already run to such a length that I dread wearying you. Perhaps on some future occasion you will do me the honour to listen to some remarks of mine, not only on the complications of remittent fever, but on the prevention of this fever.

YERBA-MATÉ.[1]

In the Journal of Tropical Medicine of April 1st, 1903, a request was made that some reader in South America might supply information regarding Paraguay tea, or yerba-maté.

Living as I do in the heart of Paraguay, and having travelled in the Argentine, and continually coming in contact with the Brazilians of Matto Grosso, I have collected a good deal of information regarding the subject.

Paraguay tea, or yerba-maté, is made from the leaves of the *Ilex paraguariensis*, which are prepared by drying over a slow fire, pounding in mortars in the ground, and finally packing in fresh skins, which are then dried in the sun.

The preparation of the yerba-maté constitutes one of the chief industries of the Paraguayans. Since it was introduced by the Indians to the first Spanish conquerors it has remained the common drink of a large part of the populations of South America. Its use is still spreading and becoming universal throughout South America. In Paraguay and Argentine it has for generations formed the one stay and stimulant of the working classes. It is largely consumed also in Brazil and Chili—although the Brazilians, as a rule, prefer coffee. The South Americans are naturally a lazy, easy-going people, but the energy and life that are infused into them by maté are simply wonderful.

In the "Quebracho" industry, large numbers of labourers are employed in felling the huge trees and cleaning them. These woodmen are at their work always with the first streaks of dawn—this in the summer time means between three and four o'clock. Before they start they have their maté. Every now and then, as he leans on his axe, the woodman takes a suck of cold maté. On this and nothing more he works with the greatest energy, and without one sign of flagging or fatigue for fully six hours on end. Towards mid-day he has his meal of meat, maize and mendioca.

The peon, or cow-boy, rises before three in the morning to go for "rodeo" to round up the cattle. He takes his maté before he mounts, and with him he carries slung to his saddle bow his maté pot. On maté he rides hard often until mid-day or after, and at the end appears little fatigued. Having had occasion to make long journeys on horseback for days through rough, uninhabited country, often in the great heat of summer, sometimes through heavy rains and floods, I can give my emphatic testimony that yerba-maté is very much superior in its invigorating and sustaining powers to tea, coffee, or cocoa. It has been proved here to be the best remedy for the *ennui* and languor of this tropical climate.

For night work, study or nursing, we much prefer it to tea or coffee, as it not only keeps one awake, but supplies an energy and lightness that make one's duties a real pleasure. Yerba-maté is prepared as an infusion by pouring boiling water on the maté in the maté pot. It is to be drunk immediately, or, rather, sucked through a metal tube. At first one is inclined to get the lips and tongue scalded, but soon one gets accustomed to drinking the almost boiling water. The workmen very often use cold water to make the infusion; and at some occupations Paraguayans are continually sucking "tereré," or cold maté.

Sometimes it is infused like tea and taken with sugar and cream; most prefer to take it bitter, in the native fashion. There is no doubt that sucking it through the tube has a much more stimulating and refreshing effect than taking it from a cup. The stimulating effect of sucking, say, three or four ounces of maté infusion, will last for as many hours. One easily gets accustomed to the bitter taste, which altogether differs from that of tea, so much so that one soon comes to consider it a very agreeable and even palatable drink. Yerba-maté has been analysed as follows:—

Matter soluble in ether, chlorophyll, wax and resin	10·30
Cafetannic acid	16·43
Extractive matter and gum	18·30
Vegetable albumen	3·70

[1] The author of this interesting communication omitted to enclose his name. The Editors request that he will send his name for publication.

Fibre	32·08
Ash	2·16
Caffeine	1·17
Water	10·00
Total	94·24

The most important of these substances are cafetannic acid and caffeine. Recently some rather interesting observations have been made on maté. Caffeine is said to exist in tea, coffee, and maté in the proportions of 4, 3, and 2. For a long time it has been recognised that the employment of caffeine in small doses serves as a most useful stimulant of the nervous and circulatory systems, and as such serves to increase the physical and mental energy. At the same time it is known that the use of larger doses produces a kind of indigestion, as well as very marked nervous symptoms.

Some bad effects produced by coffee and tea are caused by the larger proportion of volatile oil contained in these. There is over a hundred times as much of this in tea and coffee as in yerba-maté, so that with maté there is much less risk of the unpleasant symptoms of headache, giddiness and indigestion.

The smaller proportion of caffeine contained in yerba, although sufficient to strengthen and invigorate the nervous system, is not sufficient to produce the untoward nervous symptoms often following the use of tea and coffee. It is thus because of the smaller quantity of caffeine contained in the yerba-maté, and especially because of the infinitesimal proportion of volatile oil it contains, that from a hygienic point of view yerba-maté ought to be preferred to other beverages that contain caffeine.

"Yerbe-maté stimulates much and never debilitates."

Meniert, of Dresden, says: "It appears to me that yerba-maté is one of the best beverages, especially for labourers, and that because it re-invigorates the failing energies and re-inspires the desire for work, and thus combats the evil effects of alcoholism."

I have not seen yerba-maté cause any untoward symptoms except in very rare cases. Very neurotic or neurasthenic individuals generally have their symptoms aggravated if they take maté in excess. A maté "habit" may be formed, and although no very evil effects seem to come from it, the victim remains as much a slave to maté as others do to alcohol.

The peons, or labourers, who come from the "Yerbales" are often very anæmic and cachectic looking. This they attribute to the "habit" of drinking tereré, or maté made with cold water. This is not to be wondered at, as many of them prefer to travel or work for whole days, taking no food and drinking only tereré. On examination these cases are generally found to be malarial, too. They say also that excess of cold maté predisposes to malaria.

After three years' residence in the country of yerba-maté, I can testify that I have found maté when compared with tea, coffee, and cocoa to be the beverage *par excellence* for those who have to engage in either physical or mental toil, and, as a writer says: "When the old world discovers its error in not utilising the leaf of the ilex, when the working man, instead of drinking indifferent coffee, adulterated with chicory, burnt barley or beans, shall have found out that yerba-maté is the cheapest, most wholesome, and tone-giving of beverages, then the ports of Europe will be thrown open to the trade, and its population swell the demand for an article of diet that ranks among the very best."

MUNICIPAL SEWERAGE.

By Major F. Smith, D.S.O.
Royal Army Medical Corps.

(*Continued from p.* 291.)

Part II.

The System selected for the Tropics.—I take Freetown, Sierra Leone, for my example of a tropical town.

Freetown, its People, Climate and Diseases, also its Sanitary Condition.—The annual rainfall is about 165 inches, the highest monthly average being about 40 inches in August; but for half the year there is practically no rain. The maximum daily fall in 1898 was 4·40, but it is sometimes higher than this—such a daily amount, however, usually only occupies a small portion of the day in falling. The mean temperature is about 80, and a rise to 90 would be unusually high. Relative humidity, 74 per cent., average 84·5 in August. Tension of vapour, ·808.

The population of Freetown consists of two or three hundred Europeans and a large number of educated, English-speaking, Sierra Leonians or Creoles (they themselves like to be called Creoles on the ground that, though of pure African descent, they are not natives of the colony; they are descendants of released slaves from America and other places whence our ships brought them). There are also in the city many Mahomedan negroes from the interior and a host of Pagan natives, Mendis, Timanis, Limbas, Susus, &c., from the immediate hinterland; of late years a sprinkling of Syrian pedlars has become permanently resident. The total population is between 30,000 and 40,000, living in a somewhat straggling town spread over a large area.

The chief diseases are: Malarial fever, diarrhœa, respiratory disorders, filariasis, unclassed fevers and leprosy. Small-pox, though prevalent in the hinterland, is uncommon in the vaccinated town community.[1]

Freetown Mortality.—The infantile mortality, as in most tropical towns, is high—appalling, the M.O.H. calls it—viz.; (1898), infants under 1 year, 376 per 1,000 births; children under 5 years, 120 per 1,000. The rate for England and Wales is, roughly, 150 and about 60 respectively for the above age groups. But some English towns have nearly as high rates as Freetown: Thus, Strand district of London in 1898, under 1 year, 226, under 5 years, 110. Liverpool, 219 and 114—taking male children only under 5, Liverpool rate was 121, which is more than Freetown. All the same, the mortality of 376 per 1,000 under 1 year is, as the M.O.H. says, "appalling,"

[1] Yellow fever, fatally epidemic in the old days, is now unknown in Sierra Leone, but is met with both up and down the coast of West Africa.

The death-rate at all ages was, roughly, 29 per 1,000 in 1897; deducting children under 5 it was 19 per 1,000. This is a high death-rate, but does not seem unduly so as tropical cities go—especially when we consider that being the only town of any magnitude in the country, it attracts all sorts of ne'er-do-weels, cripples, lepers, and other nondescripts from miles and miles around. Take the following home rates for comparison: England and Wales, 1861-70, 22; Newcastle, 1871-80, 26; in Preston for same period, 28; St. George's-in-the-East, 1881-90, 26: evidently there are worse places than Freetown.

Official Health Report, Freetown.—But the M.O.H., Dr. W. T. Prout, one of the most able men on the coast, and an authority on tropical disease questions, is concerned about it.[1] The following extracts from his report show how he accounts for such ill-health as does exist. "It will be seen that the most frequent causes of death are those attributed to fever (70) and nervous system (61). Of the latter the majority are due to convulsions, and this is most probably caused by improper feeding." He is speaking of the children, of course. Another large portion of infantile deaths are attributed to "the general use of midwives, whose qualifications for this work are of the flimsiest description. . . . . ." So far insanitary conditions are not held to account for deaths; but coming to digestive disorders, he attributes these deaths therefrom to "general contamination of the soil, *and also to the character of the food*" (the italics are mine). Rheumatism is ascribed to "damp and ill-drained dwellings." He points out that there are no public urinals; and then comes to cesspits, of which he says there are 30,000 people using them, and continues thus: "every day there is being deposited in the soil of a densely-populated town, and deposited under conditions which render excreta liable to the worst forms[2] of decomposition, about 42 cwt. of solid excreta."

Let me deal with the report from my own point of view, remarking incidentally that it shows how insanitary conditions remain unaltered year after year in reputedly unhealthy places in spite of the efforts of the medical officers to stir up the people to a sense of their shortcomings.

First let me say—and this fact is also pointed out by Dr. Prout—the so-called cesspits are mere holes in the ground, not deep, not properly covered, and liable very often to flooding by surface water; the wells are also mere unprotected holes in the ground. Moreover, and this is most important to note, they are deeper than the cesspits, which are generally only half a dozen yards away; a well, indeed, is generally within a dozen yards of two or three of these cesspits. In the dry weather the water level in the well is several feet below the level of the bottom of the cesspit. The wells being merely protected by a coping, the surface water pours directly into them during tornado storms, when two or three inches of rain may fall in a few hours. The water must be very bad indeed. Now, on referring to Dr. Prout's report again, I find that the healthiest portion of the town is that in which there is water in pipes from the hills—partly a town supply and partly an overflow from the Imperial military waterworks in the hills.

The surface drains mentioned in the report are intended to carry off rain water, but, as Dr. Prout says: "even for this they are often inadequate." They are more than inadequate, they are so badly arranged and constructed that the water will not flow. As far as health is concerned some streets would be better without them, inasmuch as they form breeding pools for Anopheles larvæ after the rains have ceased and the streets become dry.

The compounds of houses and the streets contain pools of larvæ during the rains, especially in the poorer and most crowded parts of the town, where bush natives, ignorant of town life, congregate in squalor and filth. The municipality cannot find fault with these people until it has provided proper street drains for the house drains to be run into.

The compounds of houses are usually covered with refuse, as there is a permanent heap in one corner (latterly a totally inadequate number of street bins have been supplied).

Where do most of the people and the children die? In the poor native quarters. There the people crowd together in the most flimsy, dirty hovels, insufficiently fed, clothed and washed; infinitely worse off than in their native bush. Fever kills many children, directly and indirectly. The old, the sick and feeble are not so well cared for as they would be in their native villages. Above all, the drinking water is vile in these parts of the town,[3] whereas in the country water is good and plentiful. Dr. Prout, in allusion to the high rate in one of these quarters, says: "Here the water supply is defective, cesspits abound, and there is considerable overcrowding," and he says much the same of all the unhealthy areas.

I fully expect that the death-rate will rapidly improve when the new water comes into general use and the wells are filled up, in spite of cesspits.

(I am bound to say here that the military death-rate, in spite of good barracks, good food, good water, and pail closets, is relatively higher than the Freetown rate, the average being nearly 20 among adult males in the prime of life.[4] This rate includes West Indians, however, who suffer severely from malaria—almost as much as Europeans when they [the West Indians] first arrive in the country—and tubercle.[5] The 20, for instance, includes 6 per 1,000 for malaria and 5½ for consumption. Dysentery and diarrhœa are uncommon among soldiers in barracks in Freetown.)

A further improvement in the health of Freetown

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[1] "Sanitary Report of the City of Freetown," 1897-1898. W. T. Prout, M.B., Edin. (Lionel Hart and Co., Liverpool.)

[2] Exactly what is meant by the "worst" form of decomposition I do not know.

[3] The new water-works in course of construction under the superintendence of Mr. Maxwell Quill are very fine indeed, and on an elaborate scale. (The Central Government has had to do this by borrowing the money.) Pure water is to be brought from distant hills and stored for the dry season.

[4] The yearly average to 1898.

[5] Tubercle seems to have a special affinity for Europeanised or Americanised negroes.

will take place when Dr. Prout's recommendation for "(1) the adoption of a system of subsoil drainage; (2) the construction of properly cemented surface drains, and (3) the compulsory paving and cementing of yards and surface drains leading from them" are carried out—the second or the third would be of great value by itself.

The cesspools will cease to be so harmful in themselves after the improvements in water supply, &c. The emptying will be the chief danger.

Which, then, is the suitable method of dealing with the excreta in Freetown?

In Freetown, of all places, it is essential that any system to be of value should apply to the poorer natives as well as to the well-to-do; for in this city, though there are poor quarters there is not as yet a separate place for Europeans, as in eastern towns, nor for the better class of natives.[1] They are more or less jumbled up together. Any scheme adopted must therefore not be very expensive as far as householders are concerned—the natives could not afford it. The cost of a water-closet, for instance, would be more than the cost of the house in some cases; more than the landlord's whole capital. The actual outlay involved in fitting up works of the kind is greater than in England, as everything required must be imported from Europe.

From Report of the Medical Officer of Health, Freetown, 1897-8.

TABLE SHOWING THE METHODS OF SEWAGE REMOVAL IN THE CITY.

Wards	Number of Persons using Water* Closets	Number of Streets in each Ward	Description of W.C.			In what condition found when last visited		Number of Premises without Water Closets	Remarks
			Dry Earth System	Cesspits	Open Pits	Good	Bad		
									Districts:
Central	8,599	68	45	1,341	51	1,088	349	270	III., IV., V.
East ..	5,172	72	9	660	82	542	209	335	I. and II.
West ..	6,721	65	3	649	153	524	281	630	VI., VII., VIII.
Total	20,492†	205	57	2,650	286	2,154	839	1,235†	

* The word *water* might have been left out. There are no water closets properly so-called. Dr. Prout uses the term generally for all sorts of closets.

† The report deals with only a portion of the population apparently—there are more than 20,000—perhaps the balance is represented by the 1,235 premises without closets of any kind. There are six public latrines in the town, providing accommodation for only 26 persons. Dr. Prout estimates that 30,000 people in Freetown use the cesspits.

It has been shown that no system is perfect, but that the water system comes nearest to perfection. Therefore I should like a water system if I can see any way in which it can be obtained for Freetown. In these difficult situations one is always inclined to compromise, therefore the temptation to save trouble by doing so must be resisted as long as possible.

According to Dr. Prout's report the pail system is already in use in some houses, chiefly in the central ward, *i.e.*, where all the large stores and offices are. They are also used in barracks and by nearly all the European residents. There are only fifty-seven of these closets all told, exclusive of the barracks. The M.O.H. advises the general use of pails, provided by the municipality at the householder's expense. Coming to the question of emptying these pails, he is, however, confronted with the difficulty of getting this paid for, and he is driven to the conclusion, on the score of expense, that each householder must empty his pail (simple pails without absorbent material are recommended) into a cart. The pail is to have a lid and so is the cart—a trap-door lid to obviate the small nuisance. The carts will be taken to certain localities at early morning hours to receive their burden, which will then be placed in hoppers and towed out to sea; people living near the sea are to be allowed to empty their pails directly into the hoppers. If this plan be adopted it will, in my opinion, be a failure. As may be gathered from my remarks on pails generally, I consider it has grave sanitary defects in a tropical country under any circumstances. In addition I am convinced from my knowledge of the native that in the first place every effort will be made to escape the initial cost of a pail (it is not proposed to provide two), the pail will always be filthy, three parts of the pails will never be emptied, except when personally ordered and superintended by an official, another portion will not be emptied into the carts but into the nearest hiding place. On the whole it will be infinitely more dangerous to the community than the cesspits are. The cesspit at least requires very little looking after by the individual using it. I have quoted Rideal on cesspits, Reid says much the same; these gentlemen echo the general opinion of sanitarians at home on the matter. It must be remembered though that they speak with regard to the conditions of life pertaining in England, where the community is rich and willing to pay heavy rates, where there exists all the means for constructing, in their greatest attainable perfection, the most modern scientific apparatus, and getting it looked after with some approach to conscientiousness on the part of the workmen. The cesspool is vaguely said to poison the air (so do sewer ventilators, more), but no bacteriologist will admit that pathogenic organisms float out of cesspools in the air. The most that can be said in that regard is that foul air is generally found to contain more bacteria and less oxygen than pure air, probably because foul air is created chiefly in places where the air is also still, as in towns, where houses screen off the wind. The preponderance of bacteria is most marked in inhabited ill-ventilated houses. The air of some sewers has been reported to be remarkably free from bacteria. Neither the cesspool nor the closet built over it need be ill-ventilated.[2]

[1] There is some prospect of a European quarter being built on a hill at Wilberforce, a few miles out of town, and the survey for a railway to this place has already been made.

[2] In making the above remarks, the writer does not wish to be thought unappreciative of the advantage to general health of a pure atmosphere, such as is found on hills and in the open country.

In the country districts in England cesspools have not been considered injurious to health except by polluting water, provided that they are not actually under the dwelling houses. They are still recommended by some sanitarians for use in the country at home. Still, where crowded together they may have more serious influence on health; so may pails.

If a cesspool or privy is of such a character that it pollutes the surrounding surface soil then it *is* a danger probably, inasmuch as the soil would be likely to prove a habitat for pathogenic bacilli either from the original privy contents or from some other source. In this respect, then, some of the Freetown holes in the ground are gravely insanitary.

But there are cesspools and cesspools. I think I have shown clearly enough already that bad water-closets, bad drains and, above all, badly managed pails, menace the public health quite as seriously as do bad cesspools.

The initial expense connected with any new system of drainage or sanitation is great, both as to the municipality and the individual householder; therefore before rushing hastily into this expense it is well to think twice or several times. Is the new system going to last or will another be required before this one is well established?[1] The cesspits, some of which are, according to the M.O.H., "better built and in better condition" than others, are already in Freetown. There are also in use some earth closets. The town is very poor and will have to borrow through the Government for any extensive scheme. The municipality already finds it difficult enough to carry out what little it has to do in a sanitary way. The water system is undoubtedly the least objectionable of all the systems, especially from the æsthetic point of view, and the Freetown will no doubt want to have it some day.

My proposal therefore is as follows:—

(1) That the municipality of Freetown nominally adopt the complete water system—the sewage to be discharged into the sea.

(2) That the people now using earth closets be allowed to continue to do so provided they are willing to pay for their being emptied in such a way as the municipality may direct.

(3) That the good cesspools be allowed to remain in use until gradually superseded by the water system; proviso as for earth closets.

(4) That the bad cesspools be done away with.

(5) That a plentiful provision of public latrines and urinals be provided in the poorer localities—some for men, some for women; special latrines for Mahomedans being provided if desirable.

(6) That private closets be prohibited entirely in the grounds of such native hovels in the town as are built on the naked earth.

(7) That stringent bye-laws be enacted to deal with sanitary matters and that they be rigidly enforced by fines, &c.

[1] The M.O.H., Freetown, recommends the universal adoption of a pail system, either as described or as entirely in the hands of the municipality, but suggests that they should try it on part of the town if they do not like to make the plan general at once.

The municipality will then select the place for the outfall, having regard to tides and the possible extension of the city. They should acquire enough ground at the outfall to allow of the construction of tanks and filters if at some later date these are found to be desirable. They will also have their system planned by the engineer so that future building operations may be undertaken with due regard thereto. When they are able to afford it they will begin their main sewer. The first water closets ought to be in place of the present and future public latrines—troughs being used instead of pans.[2] In this way they (the municipal authorities) will gradually advance till they arrive at the point where they can begin to order the inhabitants of particular streets or wards to adopt the new system.

In the meantime the water reservoir must be constructed to provide for the dry weather—there is plenty of water in the hills, provided it be collected during the rains, to create good flushing.

Sanitation to be Taught in Schools.—The Government should be approached with a view to educating the new generation up to the change of sanitary method by making *sanitation a compulsory subject in the schools of the colony.*

As there will be a lapse of some (many) years before this system is evolved in all its completeness, the requirements of a good closet and cesspool should be laid down in the bye-laws and new buildings should not be passed, fit for occupation, until these requirements have been fulfilled, or a satisfactory earth closet provided.

Such existing cesspools as are allowed to remain, and the closets over them, should be improved to conform in a modified way to the requirements for new cesspools and closets.

As soon as the new water supply from the hills is established all wells should be filled up and householders be made to adopt the new water, either from the public fountains or by laying on to their houses at their own expense.

Particular care should be taken to see that condemned closets are actually demolished and the pit filled in. At the present time, or, at any rate, not long ago, there were many unused pits open to rain, &c., in the grounds around low class Freetown houses.

The emptying of pails and pools should be undertaken by the municipality—the latter not at stated intervals, but as required. The contents should not be used as manure, but thrown into the sea or destroyed in some way. The best way to clean a pail after it has been emptied is to put it into boiling water, handle and all, otherwise the interchange of pails may be a means of conveying infectious diseases from one house to another. The carts in which the pails are carried should be washed all over with strong disinfectant solution daily. A pump fixed to the cart will probably be found the cheapest, and on the whole safest, method of emptying cesspools not provided with fixed pumps—the risk of

[2] The number of public latrines and urinals will require to be increased (proportionately) as the water system is brought in. Private water closets for the low class natives should not be allowed.

infecting the ground by the hose pipe which passes into the pool must be run, but it may be diminished if the pipe is never severed from the cart and the free end hooked on to the opening in the cart as soon as the pool is emptied and before the cart moves off.

Slops and Waste Water.—As the M.O.H. says, "there is practically *no system of drainage* in Freetown" now. "A thorough survey of the town by a competent engineer is required, with a view of putting the surface drains in proper repair, rearranging them so as to provide better outlets, and increasing the fall where it is practicable."

I have detailed a system of house and surface drainage —slops should eventually be taken into the sewage system, but the surface water will take it along in the meantime. This combined waste water should run along from house gutters to properly made drains with a sufficient fall in the streets, the whole converging into a few main channels, which open into the sea at the points of natural outfall of the water, as denoted by the mouths of the streams which now run into the sea. These drains to be flushed out occasionally from the water main in the dry season, and to be kept free from obstruction by removing or sweeping along the solid contents as often as required. Gutters and drains may be of brick, cement, pebbles or stone, so long as the channel is kept patent, though cement is to be preferred where it can be afforded. Intercepting pits for solids are not desirable in hot countries. If anything of the kind is used it ought to be in the form of a grating —such a grating, however, would probably prove more of a nuisance than a benefit by getting blocked.

Refuse.—Refuse should be put out in iron pails at an early hour, as before described, and either taken out to be shot into the sea, burnt, or utilised for filling up suitable waste and hollow spaces of ground. The public not to be allowed access to such ground, and no building to be allowed thereon for five years. The public bins, if there be any, to remain also in use for the present, as the new order of things will take time to perfect even after the necessary large amount of money to start it has been obtained.

Other Cities and Towns.—This is all I have to say as far as Freetown is concerned.

The principles set forth will hold good for other places—modifications being made by those who know the local conditions better than I do.

Wherever a water system of sewerage is feasible, it should be undertaken—there are few places capable of supporting a town where water cannot be obtained. Where towns are inland, the question of effluent disposal will be the most important. If there is a convenient river of good size I should let it go into the river, and obtain drinking water elsewhere or by filtration from above the outfall. The effluent, even if filtered, will eventually get to the river, so that there would seem to be no help for us in this matter. If we are in a position to filter the sewage so much the better for the towns further down the streams, perhaps, but even this is problematical.

In places where water is so scarce that we cannot do any of the above-mentioned things, there is nothing for it but pails or privies or privy cesspools. My views on these have been given. I regard the pail as the most dangerous of the two in the Tropics. One or other of the systems will be already in vogue in the town, perhaps both. Whichever it be I should recommend that it may be made as perfect as possible, and for new houses the most up-to-date cesspools provided, along with the latest and best appliances for emptying them.

In conclusion, I would repeat that no system is perfect—that the efficient carrying out of any system is better than running hither and thither in search of the theoretically good. A good sanitary officer (if possible, he should have no other work to do), with plenty of good subordinates and a broad-minded municipal council to deal with, will be able to make something out of any system. I may add that I consider a municipal engineer with a special knowledge of sanitary engineering is a desirable adjunct to the Health Department.

(*To be continued.*)

Le Manifestazioni Cutanee da Malaria (Cutaneous Disorders in Malaria). By Dr. Antonio Vaccari. *La Clinica Moderne*, 1902, No. 52.—Various authors have alluded to skin diseases caused by or inducing malaria, but the author of this article is of opinon that this symptom has not received sufficient attention, and a wrong diagnosis may follow if not borne in mind. Dr. Corré in his work, "*Maladies des pays chauds*," described malarial urticaria carefully, as have more recently Dr. Masucci (*Annali di Med. Nav.*, 1902, No. 9) and Drs. Marchiafava and Bignami. Since 1885 Dr. Vaccari has been engaged in studying this symptom, and his observations in Sardinia and in Spezia have led him to the conclusion that the fever abated and the eruption disappeared simultaneously after injections of quinine. The cutaneous eruption consists of pomphi (raised areas) of various sizes (2-3 inches), irregularly shaped and frequently confluent. The colour disappears on pressure, the spots are slightly raised, and may appear anywhere on the surface of the body except the face, and are particularly severe on the forearms and legs. The author is of opinion that the term "malarial urticaria" is incorrect and misleading, as the malarial spots are never pruriginous, but closely resemble erythematous eruptions. The author passes in review the various theories of the origin and cause of these spots, and though he considers some of the arguments are very feasible he further considers that more study is necessary to thoroughly elucidate the subject. The works of Marchiafava, Bignami and Masucci confirm the author's conclusions; all these scientists have in fact found that there is frequently scarlatiniform exanthema with cutaneous desquamation, and that "the more severe in character was the infection, the greater was the degree of cutaneous affection." Though cutaneous manifestations are of no symptomatic value alone as a diagnosis of malaria, they assist in judging of the degree of infection by the extent of the eruption.

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THE

Journal of Tropical Medicine

October 1, 1903.

HEROIC DOSES OF CARBOLIC ACID IN THE TREATMENT OF PLAGUE.

The article we append on the treatment of plague by carbolic acid opens up a question in practical therapeutics of wide interest. It will be seen that in Hong Kong a number of cases of plague have been treated by doses of carbolic acid amounting to 144 grains in the twenty-four hours, administered in doses of 12 grains of the drug every two hours. The treatment is continued, in smaller doses it is true, for several days, yet in doses exceeding what we have hitherto considered safe. The usual teaching is that the dose of carbolic acid is from 1 to 3 grains, given not more frequently than thrice daily. Are the heroic doses tolerated by plague patients peculiar to persons suffering from that disease, or is our knowledge of the limitation of the dosage of the drug erroneous? One or the other premise must be correct; further research in the matter can alone serve to answer the question.

REPORT ON TREATMENT OF PLAGUE BY LARGE DOSES OF CARBOLIC ACID.

By J. C. Thomson, M.A., M.D.

(*Being a Report addressed to the Honourable J. M. Atkinson, Principal Medical Officer Hong Kong, July* 6, 1903.)

Sir,—I have the honour to report, for the information of His Excellency the Governor, regarding the plague cases that have been treated in Kennedy Town Hospital this year up to this date.

(2) Two hundred and eighty-two cases of plague have been admitted to this date, of which 87 were discharged cured, 171 died, and 24 are still in Hospital, but all convalescent. All these 24 will almost certainly recover completely, and for purposes of my calculations in what follows I shall class them with those cured. As the epidemic seems practically over, future admissions to the Hospital this year will probably scarcely interfere with general statements that may now be made; and this year's figures may, I think, be quite fairly compared tentatively with the total figures for previous years.

(3) At the beginning of the epidemic, as fresh curative serum is not yet available locally, and as last year's experience sufficiently proved serum imported from Europe to be useless, I decided to continue trials I had made to some extent in the two previous epidemics as to the curative value of oil of cinnamon. As an aromatic volatile oil it is antiseptic and it is absorbed into the blood unchanged, so I gave it in large doses in the form of the essence, in the hope that it might be absorbed in sufficient quantities to exercise its antiseptic action against the plague bacilli. After a further series of 30 cases, however, I abandoned it as useless.

(4) The next series of cases, over a hundred in number, I treated on general principles, symptomatically, until May 18th, when you suggested to me a further trial of carbolic acid in larger doses than when I previously used it in this Hospital.

(5) I consented to make such further trial, though, I confess, without much hope of its proving of value. I had in 1901 used this drug in a series of over 200 cases in doses of 80 grains a day, and while the mortality in that year was 76·5 per cent, slightly less than the average, I did not think it had been much affected by the treatment.

(6) It was, I think, your proposal that one should begin with an initial dosage of 144 grains in twenty-four hours, but rapidly diminish the quantity given. I determined, however, to push the remedy to the utmost and, while watching carefully against any appearances of poisoning, to give the drug in full doses so long as plague bacilli were present in the blood. I accordingly gave 144 grains of carbolic acid daily, divided into two-hourly doses of 12 grains each, and administered, as two years ago, in a mixture flavoured with syrup of orange and chloroform water, in some cases over long periods. Inspector Knight, for instance, consumed over 2,500

grains of pure carbolic acid before his blood was free from plague bacilli.

(7) With these enormous doses I expected evidence of carbolic acid poisoning to appear frequently, but it was practically unknown. In a few cases carboluria developed, but the omission of one or two doses was usually sufficient to clear the urine and permit resumption of the remedy in full doses. In certain cases dyspeptic symptoms occurred, but in these greater dilution of the mixture with water was all that was required to overcome this obstacle to its consumption.

This absence of untoward symptoms is probably an incidental testimony to the purity of the apothecary's stock of carbolic acid, as carboluria is believed to be due more to impurities in the acid than to the drug itself.

(8) As a result of observation of its use in a series of 143 cases I consider carbolic acid in large doses the most hopeful means of treating plague thus far at our disposal in Hong Kong.

(9) Before looking at the actual figures there are two circumstances that need to be mentioned, and for which due allowance must be made :—

(*a*) The treatment with carbolic acid was commenced late in the epidemic, at a stage when there is a greater natural tendency to recovery, the disease being invariably more virulent early in the season.

(*b*) Coincidently with my beginning the use of carbolic acid Dr. Bell announced his modification of Ross's method for the examination of a thick film of malaria blood as a method for the examination of plague blood, and as a consequence of this improved means of diagnosis a much larger number of very mild cases, many of which would not have been diagnosed as plague in former years, were proved to be plague and sent to Kennedy Town. These cases swelled the proportion of cases recovering.

(10) I should like in passing to express my sense of the great value of Bell's method for the diagnosis of plague. I at once put it in routine use both at Tung Wah Hospital and at Kennedy Town Hospital. At Kennedy Town it has not only added to precision of diagnosis, but it has enabled one to watch more definitely the progress of the illness; and I have used this, as I have mentioned, as my guide in the use of carbolic acid, while disappearance of the plague bacilli from the blood circulation has become a *sine quâ non* before discharge from the Hospital.

(11) The following tables show the racial and general mortality before and during the use of carbolic acid; and to facilitate comparison I submit the total figures for the current year to date alongside the corresponding figures for 1901 and 1902 :—

Before Carbolic Acid was Used
(*i.e., in the First Half of the Epidemic*).

	Cases.	Cured.	Convalescent.	Deaths.	Mortality.
Europeans ..	2	1	..	1	50·0 per cent.
Portuguese ..	..	..	..	..	.. ,,
Chinese	123	15	2	106	86·2 ,,
Other Races ..	14	2	..	12	85·7 ,,
	139	18	2	119	85·6 ,,

20

Under the Use of Carbolic Acid
(*i.e., in the Second Half of the Epidemic*).

	Cases.	Cured.	Convalescent.	Deaths.	Mortality.
Europeans ..	22	17	4	1	4·5 per cent.
Portuguese ..	1	1	..	..	.. ,,
Chinese	80	31	3	46	57·5 ,,
Other Races ..	40	20	15	5	12·5 ,,
	143	69	22	52	36'4 ,,

91

Total Cases During 1903 (to July 6).

Cases.	Cured.	Convalescent.	Deaths.	Mortality.
282 ..	87 ..	24 ..	171 ..	60·6 per cent.

111

1901.

Treatment throughout: 80 Grains Carbolic Acid Daily.

	Cases.	Deaths.	Mortality.
Europeans ..	24 ..	8 ..	33·3 per cent.
Portuguese	16 ..	12 ..	75·0 ,,
Chinese	136 ..	121 ..	89·0 ,,
Other Races ..	28 ..	15 ..	53·6 ,,
	204	156	76·5 ,,

1902.

Treatment throughout: Calmette's Serum from Paris.

	Cases.	Deaths.	Mortality.
Europeans	3 ..	1 ..	33·3 ,,
Portuguese ..	1 ..	1 ..	100·0 ,,
Chinese	80 ..	73 ..	91·3 ,,
Other Races ..	10 ..	5 ..	50·0 ,,
	94	80	85·1 ,,

1903 (to July 6).

Treatment as described in preceding pages.

	Cases.	Deaths.	Mortality.
Europeans	24 ..	2 ..	8·3 ,,
Portuguese ..	1 ..	— ..	— ,,
Chinese	203 ..	152 ..	74·9 ,,
Other Races ..	54 ..	17 ..	31·5 ,,
	282	171	60·6 ,,

(12) The *Hospital Mortality* of plague cases treated at Kennedy Town since the first outbreak of the disease in the Colony has been as follows :—

1894	76·0 per cent.
1895	—
1896	74·3 ,,
1897	—
1898	81·8 ,,
1899	81·8 ,,
1900	77·5 ,,
1901	76·5 ,,
1902	85·1 ,,
1903 (to 6th July)	60·6 ,,

(13) When all allowances, such as I have before referred to, have been made, I think it must be admitted that carbolic acid is of undoubted value in the treatment of plague, when given in such doses as to allow its sufficient concentration in the blood to exert its antiseptic action on the bacilli. It is, however, by no means a specific remedy; and while reporting thus favourably on its use, I would urge upon His Excellency's attention the desirability of carrying into effect before next epidemic season proposals already sanctioned for the production locally of a curative serum for the treatment of plague.

In connection with this subject, the suggestion by

J. W. F., in the *Indian Medical Gazette* of September, 1903, page 360, is interesting.

"There is a certain amount of evidence not, perhaps, of a very trustworthy character, that persons suffering from diseases associated with an acid state of the blood are less susceptible to plague than healthy persons.

"There is trustworthy and conclusive evidence that, *in vitro*, even comparatively weak solutions of both mineral and organic acids are destructive to the plague bacillus.

"Is there any way in which, by subcutaneous injection or otherwise, the blood of the human subject can be rendered notably acid, without danger to life, or *permanent* injury to health?

"If so, do not the two facts I have mentioned, taken together, or does not even the latter of them, create a reasonable presumption that such a method of treatment might be found of prophylactic or therapeutic value, or both, against plague? And would it not be worth while experimenting on other susceptible warm-blooded animals with the view to putting the point to the test?"

Reprints.

DHOBIE ITCH.

By Charles F. Mason, M.D.

Major and Surgeon U.S. Army, Fort Sam Houston, Texas.

The term "dhobie itch," and the diseased condition to which it is applied, constantly confront us in the Tropics. The name is applied by the laity to almost any form of itching skin eruption in the axilla or groins, or upon the feet, and the word "dhobie," which in India means "laundryman," indicates the popular belief, more or less well founded, that the disease is spread through the filthy habits of this indispensable member of society. Certainly when those habits are considered there is ground for the belief; washing the clothes as he does in cold water without boiling, and then spreading them upon the ground to dry might seem sufficient, but in the Phillipines, at least, it is not unusual for the "boy" to wear your underclothes a time or two before he brings them back.

There are at least three distinct forms of skin disease occurring in the regions indicated, which are commonly known as dhobie itch; two of them are mycotic, those due to the *Microsporon minutissimum* and to the trichophyton, and one bacterial, pemphigus contagiosus.

These diseases are very widespread in the Tropics and often cause a considerable amount of suffering and discomfort. The germs, growing on warm, moist surfaces, such as the crutch, axillæ and feet, cause intense irritation and itching, so that, especially at night, the patient cannot sleep; the scratching leads to abrasions, and these, becoming infected, to boils and small abscesses, so that the patient often cannot walk, or even dress himself. With the advent of the cool season the irritation subsides somewhat, and upon return to a cold climate the disease disappears spontaneously, to reappear sometimes under favourable conditions. It has been introduced into the Southern States of this country by soldiers returning from tropical service, and will no doubt soon become endemic among us, especially when clothing is not laundered by boiling. There are constantly cases under treatment at this post.

The diagnosis and treatment will depend upon the type of the disease, whether mycotic or bacterial, and must therefore be considered under separate headings.

Pemphigus contagiosus.—This very contagious disease, which always prevails very widely among our soldiers on first going to the Phillipines, is characterised by an eruption, most marked in the crutch and axillæ, of vesicles about the size of a pea or larger; these vesicles spring from an uninflamed base, and are unattended by fever or other constitutional disturbance. The fluid of the vesicles, at first clear, soon becomes turbid, about which time the vesicle is ruptured or dries up, leaving a smooth, pink, glazed surface with an edge of epidermis more or less undermined. The eruption gives rise to considerable irritation, the successive crops of vesicles running into each other and rendering the parts raw and sore.

The disease is distinguished from chicken pox by its distribution and the absence of constitutional symptoms, and from the mycotic dhobie by the freedom from rings, and the absence of mycotic elements, as demonstrated by examining scrapings under the microscope.

The treatment consists in thorough cleanliness of the parts and of the underclothes, sponging the affected region twice a day with solution of mercury bichloride 1 in 1,000, which is allowed to dry and is then followed by dusting with a powder containing equal parts of zinc oxide, boric acid and starch.

Mycotic dhobie.—The diagnosis is easily made by observing the festooned rings with raised margins, and is confirmed by finding the tricophyton elements microscopically in the scrapings. Sometimes, however, when there is much inflammation these elements cannot be found, even when they are undoubtedly present.

The treatment consists, first, in keeping the parts clean and dry. Then there are several medicinal agents which are almost specific; they should be thoroughly applied, once or twice a day, to the edge of the rings and a little beyond, and to all the new spots. Sometimes it is necessary first to shave a hairy part. In my experience the following agents are effective in the order named: tincture of iodine; glacial acetic acid; 5 per cent. chrysophanic acid ointment; 10 per cent. salicylic acid ointment; and 1 in 500 alcoholic solution of corrosive sublimate. The last is the most painful.—*New York and Philadelphia Medical Journal*, August 1st, 1903.

On the Gulf Coast of Mexico yellow fever is epidemic. At Merida, August 29th, 1903, there were eighty-five cases; at Progresso nineteen; and in several towns between Lumpico and Monterez, and at Linares and Victoria the daily death-rate from yellow-fever is large.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Cholera.

Shubat Chandra Mukhelji, C.H.A., in the *Indian Medical Record* of Sept. 2nd, 1903, gives the following treatment of cholera in the first stage.

℞. Ol. ricini .. .. ʒiii.
Pulv. gum acacia .. .. .. ʒss.
Liq. hydrarg perchl. .. .. ʒss.
Aqua aurantii .. .. .. ℥i.

To check the vomiting give grain of calomel half an hour before administering the above mixture. During the intervals give a dose of the following prescription to stimulate the patient:—

℞. Spt. amon. aromat. .. .. .. ♏xv.
,, chloroform .. .. .. ♏xv.
,, ether nitric .. .. .. ʒss.
Tinct. digitalis .. .. .. ♏iii.
Pot. acet .. .. gr. v.
Aqua .. .. ℥i.

Burning sensations in the abdomen and cramps in the extremities are best treated by mustard plasters.

The Dhobie in India.

Residents in the East are familiar with the popular accusation against the dhobie and his ways. Europeans get ringworm, and various animal parasites are sent home with the "clean" clothes. In addition, however, to these annoying skin pests, the *Madras Mail* draws attention to several other dhobie customs, which would seem to indicate the conveyance of still more serious ailments. Dhobies are in the habit of lending out, not only the clothing, but also the house and table linen to laundrymen for marriage feasts, &c. But they do not stop there; for it is stated that the sheets are utilised at funerals, the corpse being placed between linen sheets, borrowed—at a consideration, of course—from the washermen. The water at the tanks, also, in which the clothes are washed, has only to be seen to fully understand how parasitic infection of human beings can be brought about. It may be impossible, owing to the passive resistance of the native to institute and carry on properly conducted laundries, but it should be possible to have the clothing sterilised after the dhobie has finished with them, and before being brought home or worn.

Dysentery.

Beitrag zum Studium des Dysenteriebacillus (Contribution to the Study of the Bacillus of Dysentery), by R. Doerr. *Centralbl. für Bakt. Paras. u. Infekt.*, 1903, vol. xxxiv., No. 5.—The author reviews the dispute regarding the identity of the bacilli of Shiga, Kruse, and Flexner, and contributes his own observations of 118 cases that occurred in the epidemic of 1902 in the military camp at Bruck. Doerr's opinion as to the bacillus fully coincides with Shiga's views.

The Treatment of Dysentery, by Dr. Plehn. *Klin. Therap. Woch.*, 1902, No. 14.—Dr. Plehn recommends that, as soon as the diagnosis of dysentery is made, 30 grammes (℥i.) of castor-oil should be given to the patient to clear the intestine; when the patient has had two or three motions calomel treatment is commenced. A 3 cg. tablet of the drug (·46 gr.) is to be administered every hour for twelve hours of the day, the total daily dose thus being 5½ gr. To avoid stomatitis the drug should be given in tablet form, and the mouth should be washed out with rhatany and salicylic acid, not only during the period of treatment but for several subsequent days. On the fourth day the calomel should be discontinued, and subnitrate of bismuth should be substituted (7½ gr.). If constipation sets in it should be relieved by an enema or a dose of castor-oil. The diet should consist of thick soups, well-cooked rice, bouillon in which eggs are beaten up, cocoa and Bordeaux.

Malaria.

Beobachtungen uber die Entstchung von jungen Malariaparasiten aus alteren (Observation on the Production of Young Malaria Parasites from Older Ones), by M. Silberstein. *Centralbl. f. Bakt., Paras. u. Infektionskrankh.*, 1903, vol. xxxiv., No. 3.—Only the first generation of tertian parasites are produced by means of typical sporulation; during the further cycle of development young forms are thrown off from a residual body, one parasite only, as a rule, being thus produced. The minute parasites forming spheres may in a relatively short time be transformed into Golgi's forms.

Plague.

Plague is increasing in India and Mauritius; decreasing in Hong Kong and Cape Colony. The disease is also reported to exist in Yokohama (Japan), Niu-Chwang (North China), Chili and Brazil. Plague has disappeared from Marseilles.

The Journal of Tropical Medicine.

CONTENTS.—OCTOBER 15TH, 1903.

Original Communications.

NOTE ON THE USE OF KEROSENE AS A CULICIDE.

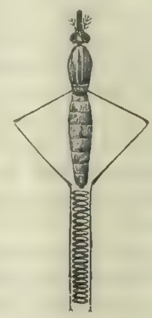
By St. George Gray, B.A., M.B., B.Ch. (Univ. Dub.).
Medical Officer, Sierra Leone.

Howard has shown that mosquito larvæ can be killed by the application of a thin layer of kerosene to the surface of the water in which they breed, and states, moreover, that the "female mosquitoes are not deterred from attempting to oviposit upon the surface of the water, and that they are thus destroyed in large numbers, *before their eggs are laid.*"

Christophers and Stephens have also remarked that adult females were killed by the paraffin on the surface of the pool where they had come to lay their eggs.

I have used kerosene as a larvicide for several years with excellent results, but my observations do not bear out the statement that *many adults* are killed thereby. Recently I devised a simple method of keeping down the number of mosquitoes in the neighbourhood of my house. It is difficult to find all their breeding places in the dense bush, so I have endeavoured to induce the mosquitoes to lay their eggs where I can get at them by putting a kerosene tin partly filled with water in a convenient position on my verandah. At first I emptied this every two or three days to kill the larvæ that swarmed in it, but later I applied kerosene instead. On inspecting my trap the morning after the first application of kerosene I found eight egg-rafts and three dead mosquitoes. Another morning (there having been no eggs on the surface of the water the night before) I found a mosquito in the act of depositing her eggs on the film of kerosene, besides nine rafts of eggs which had evidently been laid by other insects some time before. There were no dead mosquitoes this time.

The mosquito, a culex, went on with her work, and I watched the operation to the end. The fore and mid legs of the mosquito rested on a couple of the egg-rafts that had been deposited at an earlier hour, and the two hind legs were stretched out on the surface of the water behind her, parallel to each other, *not crossed* as some observers state. A single row of creamy white eggs had been laid *flat* on the surface of the water and were kept in position by the two hind legs thus:—



When the first row of eggs was completed she laid another row on the top of it, and then another on the top of that, and so on until the raft was finished. Then by a movement of the hind legs she tilted the raft so that the eggs stood on end. Presently she took wing and was about to fly away when I knocked her back into the water where she was drowned. Had I not done so she would have got away in spite of the film of kerosene on the surface of the water. The eggs rapidly became darker in colour and in a couple of hours were perfectly black.

From these observations I conclude that although mosquitoes are not deterred from ovipositing by a film of kerosene on the surface of the water, only a small proportion of them are killed by it—in this case three out of eighteen insects, I do not include the one that I so inconsiderately killed after showing me such an interesting performance, for she would most certainly have got away had I not been there to prevent her escape.

When ordinary illuminating oil is used as a larvicide it appears that *all* the adult insects that come to oviposit are not killed by it, but that the majority of the

mosquitoes get away after laying their eggs. Of course the larvæ never develop under the film of oil.

I do not wish anyone to imagine that I condemn the use of kerosene as a larvicide. There is no better known, and I use it freely for the purpose of keeping down the number of mosquitoes. I only wish to point out that it does not kill *all the adult insects* that come to lay their eggs on the surface of the water that has been treated with the oil, but that, although *some* are killed, more of them escape uninjured.

Had I used crude petroleum as a larvicide more adult mosquitoes would probably have been killed, but not having any at hand I used ordinary illuminating oil, which is less viscid. Where the breeding places of mosquitoes cannot be drained or filled in or otherwise made innocuous, we have no better larvicide than the cheapest petroleum.

REMARKS ON THE PANAMA CANAL AND THE INTRODUCTION OF YELLOW FEVER INTO ASIA.

By St. George Gray, M.B.
Sierra Leone.

In his article on "Mosquitoes and Steamers" in the Journal of Tropical Medicine, August 15th, 1903, Dr. Andrew Balfour has called attention to my omission, in my observations on the Panama Canal and the Introduction of Yellow Fever into Asia, to include the steamers themselves as possible breeding places of *Stegomyia fasciata*. He says, "neither he, nor, as far as I am aware, any other writer, has, however, pointed out that steamers may themselves serve as breeding places for stegomyia."

I confess that this omission was entirely due to oversight on my part. I was aware that steamers might serve as breeding places of mosquitoes, for I have myself on several occasions examined the water tanks of steamers for mosquito larvæ and more than once found larvæ of stegomyia in them. Some of these steamers, moreover, had come from Brazil, where yellow fever is, apparently, a fixture.

Theobald, in his "Monograph of the Culicidæ of the World," vol. i., page 82, states: "They (mosquitoes) may also be spread in the larval stage in ships' tanks, especially formerly; by such means we can readily see how certain forms have spread over a large part of the globe, and we can thus account for such anomalies as that shown by species which are found in widely separated localities, when those localities are bordering the sea."

About two years ago (I am uncertain of the date, as I have not access to a file of the journal just now), I saw a letter in one of the medical journals, I think it was the *British Medical Journal*, written by a passenger on one of the West African steamers, in which, the writer states that he found larvæ of stegomyia in the wash-hand basin in his cabin.

As the bilgewater of ocean steamers contains a considerable proportion of salt water, I do not think it probable that it would serve as a breeding ground for mosquitoes in the same way as the bilges of river steamers do. Nevertheless it should not be overlooked, and I am of one mind with Dr. Balfour in considering that "the destruction of the mosquito in any of its stages is a necessary measure."

With regard to Dr. Balfour's question as to whether or not the organism of yellow fever can be transmitted by the female imago to her offspring, I may be permitted to quote further from Dr. Guiteras' article on "Experimental Yellow Fever," in which he says "The second problem refers to the transmission of the infection to the progeny of the mosquito. With respect to this question I can report two experiments with negative results. The progeny of the insect that infected Vergara (Case 2 of the table) was kept in a separate jar and was tried without results upon three non-immunes. The large brood from the mosquito of Alvarez (all infected) was transferred to the breeding jars and there have fed upon non-immunes with impunity."

From this negative evidence it appears unlikely that the infected female mosquito transmits the infection of yellow fever to her offspring.

My suggestions were not meant as a fixed guide for the prevention of yellow fever, from which there could be no deviation, but merely an outline of precautions to be taken, which no doubt could be vastly improved upon by a committee of experts. In any case nothing should be left undone that will aid in the keeping of this scourge from the densely crowded cities of the East.

The fact of the Colombian Senate having rejected the Panama Canal Treaty, by no means lessens the danger, for under the "Spooner Act," the President of the United States was directed, should the Panama scheme fail, to proceed at once to negotiate with Nicaragua and Costa Rica with a view to the construction of a canal by the Nicaraguan route; and President Roosevelt is not the man to let the grass grow under his feet, if one may judge from the accounts we read of his doings in the newspapers.

The danger is only postponed for a while by the action, or rather inaction, of Colombia, that is all.

September, 1903.

NOTES ON THE CULICIDÆ OF DEHRA DUN.

With a Description of a new Mansonia, which mimics Anopheles.

By Major F. Wyville Thomson, I.M.S., 2nd Goorkhas.
Communicated by Lieut.-Col. G. M. Giles, I.M.S., Retd.

In forwarding this interesting communication Colonel Giles in a letter to the Editors, remarks:—

As the spotted wing Culicinæ are rather a trap to the unwary, I think it would be advantageous to publish a description of the following very curious species, which is quite different from anything at all near it, and is remarkably like some of the true Anophelines.

The following notes, sent me by my brother officer, Major Wyville Thomson, are of some interest, as they come from the foothills of the Himalayan range,

many parts of which are so notorious for malaria, and though Dehra itself is far from unhealthy, it is probable that the gnat fauna is much the same as in other parts of the Terai. His collection contains, beside the *Stegomyiæ* mentioned, *Culex concolor*, R. Desv., on the larvæ of which he gives the following interesting note :—

Larva : Large greenish, from garden tank, not common, very wary. Head with prolongation in front of antennæ; lateral hairs distinctly branched. Is most voracious, devouring all other larvæ nearly as big as itself, and quickly demolishing a whole tumbler-full. Has no tail-plates, but a large spiny process with bristles.

It also contains a *Mansonia*, with spotted wings, which is one of the most striking and beautiful gnats I have met with, and which is quite different from any other member of the genus. The following is the formal description.

Wing of Mansonia Anopheloides.

Mansonia Anopheloides, sp. n.

Wings spotted so as to closely simulate the Anophelinæ of the *Myzomyia Culicifacies* group, though the spots are not yellow but snowy. The costa is black at the apex and has a short length clothed with golden scales at the absolute base, and the intervening portion is interrupted by five snowy interruptions, less than half as long as the black between them; one subapical, one over base of anterior fork, one over cross-veins, and two further in; these spots involve auxiliary, and I. and II. and its branches. There are also spots on the base of posterior fork-cell and over posterior and middle cross-veins, but the rest of the veins, as well as the fringe, are entirely black, the veins being entirely clothed with typical bracket-shaped *Mansonia* scales. Last hind tarsal joint and apex of next pure white, above which are two broad, and two narrow white articular bands; mid and hind tarsals similarly adorned, but the last joints, though pale brown, can hardly be said to be white. Thorax clothed with black, white, and golden narrow curved scales, so disposed as to form a striking adornment of three black spots in front and a sort of horse-shoe behind, picked out with groups of white scales. Abdomen black, with narrow snowy basal bands (in the ♀), and a pair of white spots on the hinder part of some of the middle segments; entirely black, with a white patch on the apical segment in the ♂.

Head black, speckled with creamy fork-scales, some of which have as many as eight dentations on their terminal border; proboscis black, with a broad white band in the middle, and white tip; palpi of the ♀ half as long as the proboscis, black, with a white band and tip; those of the ♂ reach only to the beginning of the white band on the proboscis, and resemble those of a ♀ *Anopheles*; they are black, with a small white tip and two narrow bands; antennæ of the ♀ white, with prominent black rings on the roots of the verticils. Pleuræ marbled white and black. Legs black, speckled with orange spines; the mid and hind femora have a yellow garter just above the apex, and the mid tibiæ are mainly yellow. *Length.*—About 4 mm.—(G. M. G.)

Habitat.—Dehra Dun, Himalayan foothills. This is a rare species, only two of the larvæ, which are of a noticeable dark red, having been found in a garden tank.

The collection contains only one species of Anopheline —*Nyssorhynchus maculatus* (Theob.). I note also *Desvoidea obturbans*. Major Thomson goes on to say :—

"The Stegomyiæ I have found are all enormously plentiful, except *Gubernatoris*, which is local, the Pseudotæniata, and the possibly new one marked FWT. The male marked 'Distinct' might be the male to it.

"The undergrowth in the jungle is full of *Scutellaris*, *Sugens* and *fasciata*, and my mosquito boys bring me 90 per cent. of these larvæ. But they are stupid and will not hunt for Anopheles, although I have shown them how.

"With regard to the destruction of mosquitoes, it is extraordinary how unbelieving and apathetic the laity still are. In every compound in this station people are still breeding their domestic mosquitoes by the million, and no amount of advice will make them take the trouble to go round and look for and empty or oil their tanks, &c. I heard a man at the Club the other day, say: 'Never you mind all that nonsense about mosquitoes, but don't sit outside after sunset, and you will be all right, for it is something in the air.' He was an educated man belonging to a scientific corps.

"With regard to oiling, I find that a mixture of a little ghi with kerosene seems to spread better—the pure oil remaining in globules unless agitated. Ghi shoots out over the pool quickly, or makes the oil do so.

"I have a lot to do yet; the identification of the larvæ is troublesome, but I have spotted *Sugens* and *Gubernatoris*.

"The absence of tail-plates in some is distinctive, as in *Gubernatoris*, and the larvæ of *C. concolor*, which has a large spiny tail and bristles. Its head is striking, as it is far prolonged in front of the antennæ, and has three projecting brown lumps on the front of the head.

"Most of the dark Stegomyiæ seem to have dark pigmented larvæ, but there are some I cannot hatch out, as they always die, notably one with a very long tail-plate, which is striking.

SYPHILITIC GUMMATA INVOLVING BOTH KNEE-JOINTS.

Surgical Note.

By Wm. Robertson, M.D.

Such is the diagnosis I arrived at in the following case :—

Dyndall, aged 29, a return Indian emigrant. When admitted, June 13th, 1903, had to be carried about on account of swelling, ulceration and stiffness of both

knees. In the case of the left limb the leg was fixed at a right angle, and the joint much enlarged and covered by four fungating masses over the front aspect of the joint. They were separated by sound skin. Each mass had about two inches superfices, the surface of gumma in each case protruding half an inch from level of sound parts. A probe introduced into the boggy masses touched necrosed bony surfaces. Sinuses reached from one mass to another. Not much discharge came from these masses; there was no pain in them, nor had the patient any "cartilage pain." The left knee presented no external sore, but was enlarged by a diffluent swelling over the inner surface of joint. The leg was fixed at a right angle with the thigh and could not be extended fully. I aspirated this swelling and drew off two ounces of a thick fluid, which seemed to have been pent up in loculi in the periarticular tissues. The fluid did not come from the interior of the joint.

History.—The left knee began to swell about twelve months ago in the shape of a painless, soft, nodulated, boggy swelling round front of joint, rendering this stiff and weak. The masses burst through the skin four months ago. The right knee became affected six months ago in the same way at first as the other. The swelling was painless.

Treatment.—Being struck by the bilateral presence of a lesion evidently of the same nature in each joint I suspected syphilis. Infection was not admitted. I treated him accordingly, with the result that the gummatous masses in right knee rapidly decreased in size and the left knee diminished. In a few weeks' time he could extend the leg, and a few days later could stand on his legs and walk about with a little support. Unfortunately it was soon experienced that the patient could not stand the exhibition of mercury, which had to be stopped after ten days' use. Boracic dressings and strapping were used, and the "send-off" the Hg. had given the disease continues. After a time Hg. will be resumed. The result, however, seems to be clear that here is present a gummatous affection of both knees. The case was handed on to me as tubercular disease of knee-joints. The bilateral nature of the affection and its rapid improvement under Hg. seemed to me to point to syphilis.

Appointments, &c.

Mr. T. Frederick Pearse, M.D., F.R.C.S.Eng., M.R.C.P.Lond., D.P.H.Camb., has been appointed by the Government of Bengal Lecturer on Hygiene at the Medical College, Calcutta.

Dr. D. Burrows, Medical Officer of Sierra Leone, has arrived in England on leave of absence.

Dr. F. A. Baldwin has been appointed Medical Officer in charge of the Gambia Company of the West African Frontier Force, in place of Dr. J. C. Franklin.

Mr. R. Fox Symons, M.R.C.S., Acting Medical Officer of Health for the Transvaal, has been appointed Inspector-General of Health for the Transvaal.

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THE

Journal of Tropical Medicine

October 15, 1903.

THE NEW WARRANT FOR THE INDIAN MEDICAL SERVICE.

After many months of incubation, a new warrant for the Indian Medical Service has at length been promulgated. The conditions of the old warrant in comparison with that issued for the R.A.M.C. in reply to the just demands of the latter, manifestly placed the former service in a very inferior position, and in consequence many months ago it was found necessary to ameliorate the terms of service of the Indian Medical Service. Mr. Brodrick dealt with the conditions of the R.A.M.C. in a manifestly fair manner, and we trust that he will now inaugurate his reign at the India Office by adjusting the still remaining grievances of the Sister Service. Its officers serve in both a military and civil capacity; but whilst the military terms are in

PHOTOGRAPHS OF VARIOLOID VARICELLA IN TRINIDAD, W.I.

Communicated by Mr. Briggs Clarke, M.B.

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a pecuniary sense now rendered generally satisfactory, there are still improvements on the civil side which must be brought about before an entirely approved condition of affairs exists.

As regards the *military* aspect of the question we may say at once that the terms offered are liberal, as will be seen by the contrast between the old and the new warrants :—

OLD WARRANT.

Captain or Lieutenant under 5 years in substanted charge of a regiment	450 R. per mensen
Captain above 5 years' service ...	600 R. .. ..
Major	800 R. .. ..
Lt.-Colonel	1,000 or 1,100 R. .. ..
Colonel	from 1,800 to 2,250 R. ,, .,
Surgeon-General (1)	2,700 R. .. ..
,, ,, (2)	2,500 R. ., ,.
.. .. (3)	2,200 R. ,, ..

NEW WARRANT.

Lieutenant	500 R. per mensen
Captain	550 R. ,, ,,
,, after 5 years' service ...	600 R. ., .,
,, .. 7	650 R. .. ..
.. .. 10 .. ., ...	700 R. ,, ..
Major	800 R. .. ..
,, after 15 years' service... ...	900 R. .. ..
Lt.-Colonel	1,250 R. ,. ..
,, after 25 years' service ...	1,300 R. .. ..
,, specially selected for increased pay	1,400 R. ., ..
Colonel	from 1,800 to 2,250 R. ,. .,
Surgeon-General (1)	3,000 R. ., ,.
.. ., (2)	2,500 R. .. .,
.. .. (3)	2,500 R. ,. ..

There are in addition other improved conditions offered such as (1) substanted or brevet promotion for distinguished service in the field, in place of the promotion being supernumerary in the higher rank until promotion in the ordinary course would have occurred; (2) the granting of specialist pay at the rate of 60 Rs. a month to officers below the rank of Lieut.-Colonel; (3) the grant of extra furlough to officers desirous of pursuing special courses of study at the rate of one month's furlough for each year's service up to twelve months in all; and (4) the provision that a Lieut.-Colonel who has been specially selected for increased pay, if he attain the age of 55 before he becomes entitled to the pension for thirty years' service, may be retained until the completion of such service.

There is, however, one great grievance as yet unredressed, and that is the proviso that no officer can receive any staff allowance in addition to his grade pay until he has passed the "lower standard." Now an officer may be sent on landing in India to an out-of-the-way station, where he cannot obtain the services of a Munshi; the "lower standard" is no joke at the present moment, and thus an officer through no fault of his own is mulcted of a part of his pay. Surely t would be more equitable if all young officers on joining be sent to a Presidency town and given an opportunity of passing this examination, whilst at the same time doing duty at the Presidency hospital.

The above quoted rates of pay are those for permanent charges. The "officiating" rates of pay are also increased. We notice, however, the term "unemployed pay" is again introduced. We can only trust that under this heading will never again be included "The employed (as regards *duty*), unemployed (as regards pay"). In the year 1883, 55·2 per cent. of officers under five years' service were so employed.

Although the rates of pay are thus increased *the* great grievance of the military side is still unredressed. Officers of the I.M.S. are held to be eligible for the highest post in the Military Medical Service in India, yet not once have they held it, although there are far more native soldiers than British in India. A most flagrant example of this injustice occurred in the case of the late Surg.-Gen. R. Harvey. This distinguished officer, with a record both on the civil and military sides second to none, and with a large war service both in a subordinate and a directing position, was, if report be true, nominated for the position by the Viceroy, but the recommendation was over-ruled by the authorities at home. The Commander-in-Chief is selected alternately from the British and Indian Services—so should the Medical Head of the Military Services be chosen.

The last grievance on the military side that requires abolishing, is the parsimonious order

that an officer joining a better appointment has to pay his way thereto. We have heard of an officer in Assam having thus to pay his way up to Peshawur. We know of another officer who received a warrant to travel at the public expense from head quarters; the increase of pay amounted to 45 Rs. The journey's expenses came to 221 Rs. He was there for three months; but the authorities decided this warrant to have been given him by mistake, so that for receiving 45 Rs. × 3 = 135, he had to pay 221 Rs.

Turning now to the civil side, one great grievance *must* be rectified, and that is the distasteful order that when an officer attends a native gentleman, the question of the fee must be referred to the Civil authority if it be above a certain (not at all high) limit. Now a native chief as a rule, we believe, *sends* his medical officer his fee without being asked for it. Cannot the Government trust their medical officers not to act as Bunniahs? The Secretary of State should at once order the Indian authorities to rescind this.

Lastly, the Director-General should *ex-officio* be a member of the Viceroy's Council, and the Inspector-General of Hospitals of the various Provinces be similarly members of the Legislative Councils of these Provinces. The Director-General of the R.A.M.C. at home is a member of the Army Board. Why should not the Head of the Indian Medical Service be similarly a member of the Legislative Council at home? We trust Mr. Brodrick will see his way to granting the above eminently just demands of the Service. The latter has had a most distinguished career; it was through a member of the service that the original grant of land in India was made to the old East India Company; members of the Service in days gone by have founded many of the now great departments in the country. Of late years it has lost its former popularity, but now a golden opportunity occurs for restoring the somewhat lowered prestige of the grand old Medical Service, which we trust will not be let slip.

CRAW-CRAW.

Supposed Craw-craw in England.

In the *Lancet* of May 23rd, 1903, Mr. J. Dencer Whittles described a case of general infection by a nematode, accompanied by hypertrophic gingivitis, and in the *Lancet* of October 3rd he wrote a letter to the editors of the *Lancet* under the heading, Small-pox or Craw-craw. It appears that Mr. Whittles has met with a nematode in the blood of persons suffering from a cutaneous eruption, accompanied by marked itching, which he considers "filarial" in character. The eruption had been diagnosed as small-pox, as chicken-pox, &c., but in the vesicles on the skin Mr. Whittles finds a nematode. In the first article sent to the *Lancet* he believes that the dog is the source of infection. Whatever value is to be attached to Mr. Whittles' nematode and the associated cutaneous eruption, it is unfortunate he should have selected craw-craw as the name by which he wishes the ailment to be known. The term craw-craw is without specific significance; it is employed by the natives of West Africa to denote any skin lesion accompanied by itching, and the presence of filaria in the cutaneous vesicles or papules may be accidental merely. Until, however, we have had the parasite described by Mr. Whittles submitted to examination by expert helminthologists or parasitologists, we would warn our readers against accepting either the presence of the nematode or the diagnosis of craw-craw in regard to its nature and significance.

British Medical Association.

VARIOLOID VARICELLA IN TRINIDAD:

Observations on its Nature, Origin, and Mode of Spread based on the Observation of 4,029 Cases.

By J. R. Dickson, M.B., C.M.Edin., *and*
C. F. Lasselle, M.D.Edin.

[Abstract.]

This disease, which was at first considered to be varicella, is characterised by the following main features. In general terms it is a febrile disease contagious in nature, with definite stages of incubation, invasion, and the appearance of a cutaneous eruption.

Period of Incubation.

The exact determination of the duration of this period is attended with difficulty, as the history obtainable from the class of people most frequently affected —that is, the unskilled labouring class—is vague and indefinite. The duration, however, may be approximately fixed from the following cases, in which the dates of exposure to infection and the invasion of the disease are definitely known. Generally the history obtained indicated a lapse of about a fortnight after exposure to infection before the appearance of symptoms. The duration of the incubation period of the disease may therefore be taken to be from ten to fifteen days.

Symptoms of Invasion.

The usual history obtained was one of fever and headache for three days, followed by the appearance of a rash. General muscular pains, fever and headache were present in most cases. Of muscular pains, backache was most frequently specified as a special symptom. Vomiting occurred in about one-fourth of the cases. These symptoms varied from slight pyrexia and headache to high fever with delirium, and it was observed that when they were severe the subsequent attack was usually mild. Frequently there was a feeling of *malaise* for one or two days, and it was only on the appearance of the rash that this symptom was recognised as the invasion of the disease. The duration of this period was usually three days, but in many cases it extended to five to seven days, while in others it was as short as one day. During this period the patient felt ill and kept to bed. As a rule, the temperature fell to normal on the appearance of the rash, and the patient felt better, but not infrequently the pyrexia continued for several days. No initial case of any kind was observed during this period.

The Eruption.

The rash usually appeared on the fourth day of the illness as papules, and, generally speaking, went through successive stages of vesiculation, suppuration, desiccation and desquamation. These stages were not characterised by any regular or typical sequence, and in cases seen after the full establishment of the rash, the most prominent feature was a polymorphic eruption of vesicles, pustules, drying pustules and crusts, of various sizes side by side. The rash invaded the body in successive crops. From cases kept under close observation it was evident that they were distinct and definite crops, and not an appearance due to retarded development of certain of the elements. The rash usually appeared first in the face, forearms, and front of trunk, and generally simultaneously. In cases observed in the general wards of the Colonial Hospital from the first onset of fever the rash frequently appeared first on the forearms and hands, or on the legs. The papules were readily seen, and rarely presented any special firmness on pressure. Vesiculation occurred early, and with rare exceptions within three days of the appearance of the rash. In a large number of cases it was complete within forty-eight hours, and in many cases numerous well-formed vesicles were seen on the first day of the rash. As a rule, the vesicles gradually increased in size, and the contents, at first clear serum, became turbid, sero-purulent, and purulent on the eighth or tenth day. At this time these elements had generally developed into large, distended, unilocular bullæ, measuring 5 to 10 millimetres in diameter, and on being pricked exuded a sero-purulent fluid and collapsed. Frequently, however, the contents were either entirely clear serous fluid, or serous fluid and more solid mucoid material. These bullæ were more especially constant on the extremities. Frequently well-formed bullæ developed without passing through a preliminary papule stage. Similarly in many cases vesicles with thin, translucent, glassy envelopes occurred without a previous papule stage. These vesicles dried without becoming pustular. True umbilication of vesicles was rarely observed. Apparent or pseudo-umbilication, due to the commencement of the process of drying at the central prominent part, which caused a shallow depression, was a common feature. In other instances the type of the element was what would be best described as a vesico-papule—that is, a raised papule surmounted by a shallow vesicle, the papule having only undergone vesiculation in its central and most prominent part. These vesico-papules occurred in vaccinated as well as in unvaccinated people. There was no regular and definite stage of pustulation. It was irregular in extent, and as regards the different elements. The bullæ more especially became pustules, but the development was gradual and generally tardy. It was frequently observed, both in vaccinated and unvaccinated persons, that numerous vesicles dried up and crusted without becoming pustules. The vesico-papules became sero-purulent, or purulent, in their upper portions only, and then dried as a whole.

The mode of desiccation varied according to the type and site. On the face, as a rule, this occurred early—that is, from the third to the sixth day. The drying process began at the apex as a yellowish-brown scab. Rupture of the wall occurred at this point. The contents dried as they escaped, and gave rise to light yellowish crusts. These were easily detached, and were seen to have been imposed on a firm raised base, the surface of which was dry. These excrescences were a constant feature. They were slowly absorbed, and in about two weeks were replaced by macules varying in hue, but usually pink or black, according to the colour of the patient. In the majority of cases the macules were at the surface level of the skin, but frequently further contraction and absorption occurred resulting in the formation of shallow pits. The elements on the trunk dried early, frequently earlier than on the face. The bullous elements ruptured easily, their contents escaped, and the cuticle collapsing on to the base assumed the appearance of a piece of thin wrinkled parchment. The surface underlying this was flat and dry. The vesico-papules usually scabbed. On the palms of the hands and soles of the feet, the elements, whether vesicles or pustules, usually dried without rupturing, their contents becoming inspissated and absorbed. After desiccation was complete the resulting surfaces were generally flat, circular in shape, with a dark pigmented periphery surrounding a light-coloured centre. Frequently they were surrounded by a fringe of separated cuticle, which was gradually shed. Occasionally these spots presented an irregular mottled appearance. Gradually the surfaces became uniformly dark. The stains faded, and even in cases in which they had been very numerous had very largely or entirely disappeared in from three to four months. In some cases this occurred earlier, whereas in others some of the macules persisted, and were distinguishable about nine months after.

Distribution of the Rash.—As a rule, the extremities, face, and back of trunk were the parts most affected, the palms of the hands and soles of the feet were frequently affected, the severer the case the more constant

the appearance of rash on these sites. The severer the case the more copious relatively was the rash on the trunk, and the elements showed a greater tendency to be confluent on the forearms and flanks than on any other part of the body.

General Symptoms.

In the large majority of cases there was marked absence of constitutional symptoms, and it was difficult to persuade patients to remain indoors. Even in cases plentifully covered with the rash, the constitutional symptom were slight as compared with the amount of eruption. When the eruption was fairly copious, discomfort due to burning and "tight feeling" of the skin, more especially of the hands and feet, was all that was complained of. In addition to this, the symptoms, when present, were one or more of the following—namely, pyrexia, depression, malaise, aching pains, and sore throat.

Pyrexia.—In upwards of 95 per cent. of cases there was no rise of temperature after the period of invasion. In many cases the temperature, usually of an intermittent type, continued raised for two or three days after the appearance of the rash. Pyrexia during the further course of the disease—namely, from the eighth to the twelfth day—occurred in a very small percentage of cases only. Out of 406 cases treated in the isolation wards of the Colonial Hospital, secondary fever occurred in thirteen only.

General depression rarely occurred in any marked degree, and was more especially observed in those who were debilitated from privation or old age, or were the subjects of chronic disease. In the isolation wards of the Colonial Hospital, where the severer cases were treated, a relatively small number only kept to their beds, and to anyone visiting these wards the cheerful countenances and general bearing of not being seriously ill were striking features. After the stage of invasion the appetite was, except in a few cases, excellent, and the ordinary full hospital diet for convalescent patients was insufficient.

Malaise and aching pains varied with the amount of eruption, and were rarely urgent.

Sore throat was a fairly frequent symptom, and varied from slight congestion of the pharynx and fauces without eruption to marked congestion with the occurrence of a greater or less amount of vesicular eruption. In many cases in which the skin was abundantly covered with rash there was no throat affection.

Complications.

Excepting in the severer cases complications were either absent or of a mild nature. In order of frequency these were :—

Eye.—Catarrhal conjunctivitis occurred very frequently. Corneal ulcer was an occasional complication.

Digestive System.—Diarrhœa occurred early and was mild. At a later stage it was usually severe.

Nervous System.—In children, occasional convulsions. In one case in which the attack was mild, convulsions suddenly supervened and caused death.

The urine was as a rule normal. Of 406 consecutive cases treated at the Colonial Hospital in the isolation wards, in 347 the urine was free of albumen; in 59 cases albumen was present generally as a trace which disappeared during convalescence. As a rule the disease occurring in pregnant women ran its course, without producing abortion. Premature birth of the fœtus occurred one or two weeks after the recovery of the mother in several cases. In others the course of gestation was uninterrupted. In the premature births the fœtus presented signs of the disease, and it was evident from the stage of the eruption that the fœtus had contracted the disease about one or two weeks after its appearance in the mother.

Sequelæ.

Boils and abscesses were the only sequelæ and occurred in about one-third of the severer cases.

Microscopic examination of the contents of the elements showed: First to fifth day, lymphocytes and polymorphonuclear neutrophiles in increasing numbers. Sixth to seventh day, cloudy swelling and commencing disintegration of the cells. Seventh to ninth day, more complete disintegration; after this the contents were purulent.

Cultures on agar-agar from vesicles, sixth to eighth day, showed typical growths of streptococcus pyogenes.

Recurrences or Second Attacks.

Twelve cases of second attacks—occurring one to seven months after complete recovery from the first attack—have come under notice. These cases were all reported by medical practitioners and seven of them were seen by both of us. The symptoms of invasion, the character of the eruption, and the resulting maculæ were similar in both attacks and of the same nature as those of other cases of the disease.

Duration of the Disease.

This varied with the severity of the attack, being very short in mild cases, and on an average did not extend beyond three weeks. The duration of stay in hospital may be taken as a criterion of the duration of the disease. An analysis of 406 cases treated in hospital shows an average stay in hospital of 16·8 days. These cases were as a rule all discharged cured and after desquamation was complete.

Age Incidence.

This is shown as a percentage, based on an analysis of 4,029 cases, in the following table :—

Under 1 year	2·0 per cent.
1 to 5 years	3·0 ,,
5 to 10 ,, ...	5·0 ,,
10 to 20 ,, ...	25·0 ,,
20 to 30 ,, ...	35·5 ,,
30 to 40 ,, ...	20·0 ,,
40 to 50 ,, ...	8·0 ,,
50 to 60 ,, ...	1·0 ,,
60 and upwards	0·5 ,,
	100·0

Origin and History of the Epidemic.

The first case of which there is a record was that of an inmate of the lunatic asylum, St. Ann's. The asylum is situated in an isolated position beyond the limits of the town.

This patient had been an inmate of the asylum for some years, and developed the disease on April 16th, 1902. The case was isolated on the appearance of the rash; but other cases appeared during May, June, July and August, until nineteen inmates and attendants, all adults, were affected. The source of infection could not be traced, and must have been either a visitor or attendant who had a mild attack and escaped notice. The cases were returned as varicella, but the medical superintendent has since reported that they were similar to the cases of eruptive fever now occurring, and in one instance—that of an attendant who had the disease in August, 1902—a few pigmented marks, identical in appearances with the macules already described, were visible up to about a month ago. It is of interest that of the nineteen cases ten were in vaccinated and six in unvaccinated persons, and in three the evidence of vaccination was doubtful. The most severely attacked were an inmate, vaccinated in infancy, and an attendant revaccinated in 1898, and showing three good marks of successful vaccination.

On May 2nd, 1902, a similar case in an adult was reported from Woodbrook, a suburb to the west of Port-of-Spain. Cases next occurred in Dundonald Street, in the north-west of the town, in September. Early in October a woman who lived in a barrack yard in the south-east of the town developed the disease within a fortnight of her arrival from Yrapa in Venezuela. About the third week of October a case, that of a trader who had recently come from Guirai in Venezuela, occurred in Duke Street, about the middle of the town. Both of these cases lived in largely-tenanted barrack yards, did not seek medical aid, and were not reported at the time. Other inmates of these yards were subsequently affected, but this fact was discovered only in the early part of December, and after they had recovered. During November eleven cases occurred in the middle and south-east of the town, and though in all probability the two cases above quoted were the sources of infection, yet there is ground for believing that in three of the cases the contagion was derived from other sources. Five of the cases occurred in one yard in Duncan Street in the first week of November, and of these the two who showed the most distinct vaccination marks were most severely attacked. During December 8 cases were reported from the eastern, south-eastern, and middle portions of the town. Of these, one was a vagrant, who developed the disease within a week of his arrival from Yrapa. In January, 1903, a house-to-house inspection was instituted, other cases were discovered in various parts of the town, and the disease began to assume epidemic proportions. At first the majority of persons affected were hucksters, sailors, and quay labourers, that is, were of that class of the population which would earliest be exposed to contact with an imported disease. Reports of the prevalence of a similar disease in the adjoining coastal villages of Venezuela had for some time been circulated, and early in February information was received that several deaths had occurred, and that the disease was now stated to be variola. With the view of obtaining accurate information, a commission of two medical practitioners, one of whom had had extensive experience of small-pox, were sent to Venezuela to investigate and report on the nature of the eruptive fever prevalent there. The commissioners visited Yrapa and Guiria. The following extracts are taken from their report:—

"The disease had existed in Yrapa for nearly a year, and had not varied in character, that is, had always been a mild affection. Two deaths had occurred in the country around. One was that of a chronic alcoholic, the other probably died more from privation and neglect than anything else. We visited Messrs. Fournelli and Cottin, both Frenchmen, long established in Venezuela. Their households had not been attacked, and they were under the impression that Europeans were spared. Mr. Fournelli stated that in Carupano, where there was a large European community, and where this disease had been very prevalent, no European had been attacked. These gentlemen informed us that no alarm was even felt at Yrapa about the sickness—that they called it 'lechina' (Spanish for chicken-pox). As a proof of the mildness of the disease, they referred to the attack of Guiria by the revolutionary force from Yrapa, when many of the troopers, though covered with the eruption, carried their Mausers cheerfully to battle. The Commissioners came to the conclusion that the disease was exactly the same nature as that occurring in Port-of-Spain, and was not small-pox. They expressed the opinion that the disease was imported into Trinidad from Yrapa. There is a largely daily passenger and trade traffic between Port-of-Spain and the villages on the adjoining Venezuelan coast, and the voyage does not occupy more than one day. Under these circumstances, and in view of the instances above quoted, there seems to be little doubt that the disease was introduced into Trinidad from Venezuela.

From returns it would appear that the susceptibility both in vaccinated and unvaccinated persons increases from early age and attains its maximum at the 20 to 30 age period. After this it diminishes with each subsequent period. It was commonly observed that a large proportion of mild cases occurred in unvaccinated people, and that many of the severer cases occurred in people who were vaccinated and showed good marks.

(2) *Incidence on Recently Vaccinated Persons.*—Of 312 reported upon, 28 were among recently vaccinated and revaccinated persons. Four cases occurred within one year of vaccination; 8 within three years; 4 within four years; 11 from four to eight years.

(3) *Vaccination during the Incubation Period.*—Vaccination within the first five days of the incubation period appeared to modify the attack. Several persons were vaccinated at the end of the incubation period, that is, a day before the occurrence of the symptoms of invasion, and vaccinia and the disease ran concurrently without apparently modifying one another in any way.

(4) *Vaccination during Convalescence and on Complete Recovery.*—In a series of 185 cases the following results were obtained: 145 were unsuccessful; 25 gave a modified reaction, a vesico-papule formed which crusted over quickly, a firm raised purple fibroid growth resulting. In 15 cases vaccination was successful. It is worthy of note that in three of these cases vaccina-

tion performed immediately on recovery from the disease was unsuccessful, but gave good vesicles four to five weeks later. Three persons (a primary vaccination and two vaccinations) were vaccinated with lymph from one of these cases and typical vesicles were obtained.

Mortality.

The fatality of the disease is very low. Of 4,029 cases occurring up to May 30th, 1903, there were 18 deaths, giving a case mortality of 0·44 per cent. In this connection it is of interest to note the fact that in the years 1871-2, when undoubted small-pox was epidemic in this island, there were 12,531 cases, with 2,449 deaths, giving a mortality of 19·5 per cent. This bears out the experience that small-pox in the tropics and among dark races is a severe affection, and attended with a high fatality.

Prophylaxis.

On account of the mild nature of the disease and the slight attendant discomfort preventive measures in a strict sense are impracticable. Even a house-to-house inspection failed to discover all cases, as many of those affected continued to pursue their outdoor occupations. Vaccination, re-vaccination, and isolation are the measures which experience has shown to be the most useful in dealing with the disease, but in the absence of special provisions in existing legislation for the enforcing of them, and a strong public feeling against compulsory vaccination and revaccination, those measures could not be efficiently and generally carried out.

General Remarks.

The outstanding feature of the disease is its atypical character. In some respects it is analogous to the epidemic in America of what has been termed irregular or atypical small-pox by Dr. Heman Spalding of Chicago, and some other American writers, but presents marked differences in the following particulars: (1) The occurrence of second attacks in persons who have recently recovered from the disease; (2) the successful vaccination of persons recently recovered from the disease; attacks on the recently vaccinated.

W. Briggs Clarke, M.B. (Barbadoes): With reference to this epidemic of varioloid varicella which has so recently taken place in Trinidad, and which Dr. Dickson and Lasselle have so graphically described, I am glad to be able to make a few remarks which may have some bearing on the case. Coming as I do from an area in close proximity to Trinidad, and between which there is very frequent communication, I had an opportunity of getting some information as to the nature of the epidemic in existence there at the same time that there was a serious outbreak of small-pox in Barbadoes—some 3,000 cases in all, and which extended over a period of a little more than a year. When our epidemic of small-pox was on the wane, curious and hearsay reports got about that there was small-pox in Trinidad, but designated by another name. Further, Trinidad and all the other W. Indian Islands of any consequence, and British Guiana was imposing the most stringent quarantine restrictions on Barbadoes while Trinidad was holding free communication with all ports. The British and U.S. men-of-war and all concerned in the recent Venezuela imbroglio made Trinidad their port of call. One U.S. ship called at Port-of-Spain and the men were allowed on shore; but soon after calling she cleared out suddenly, and ten or eleven days after leaving port three of her crew were certified to be suffering from small-pox. Further, a German warship called and refused to remain. A little before this time a well-known practitioner in Port-of-Spain—Dr. Masson—declared his opinion that a certain case of this eruptive fever which he had seen was a case of small-pox. This was denied most strongly by the large majority of medical men. So impressed was Dr. Masson about his possible mistake that he came to Barbadoes to see whether the case that he had seen was similar or not to what we in Barbadoes called small-pox. Dr. Masson did not change his opinion, but declared more openly than ever in favour of the epidemic in Trinidad being small-pox. These rumours, Dr. Masson's opinion, and other facts such as the notification of a case of small-pox in one of the Grenadine Islands and in Jamaica were so impressive as to cause a deputation to city representatives in the local House of Assembly with a view to sending some one to Trinidad to give an independent report on the eruptive fever which existed in it. Dr. Bridger, who I regret to say, could not attend this meeting, and who was chosen by the Government of Barbadoes to write a special report on the Trinidad epidemic after paying a visit to Trinidad for that purpose, could have given you a much more lucid explanation of the condition of affairs which he found to exist at the time of his visit. I have here, however, some photographs which were taken for Dr. Bridger for purposes of writing his report and demonstrating in a forcible manner the nature of some of these cases of eruptive fever which were present in Trinidad. I need not remind you here that Dr. Bridger wrote a most elaborate, careful and scientific report which was acted on by the Government of Barbadoes, and that Trinidad was at once put under quarantine restrictions because it was concluded that Trinidad had small-pox. Again, after Trinidad had been put under quarantine restrictions by us, other places became more than suspicious of the existence of small-pox in that island. Also British Guiana, which had hitherto been free of any such epidemic as chicken-pox, &c., began to report the existence of chicken-pox cases, and at a slightly later date small-pox. Now I am not going to say for one moment that this whole epidemic was probably one and the same disease spread over an area in which there was frequent communication, but what I do say is this, viz., that the epidemic which we had in Barbadoes at that time was small-pox, and that therefore we were justified in obtaining a special report on the condition of affairs in Trinidad, and acting up to our implicit belief that small-pox existed as such in Trinidad. I fortunately possess here three photographs which I shall ask you to take a careful look at, and if there is such a thing as a third disease of which little is known at present, there is now before you an exact representation of such which closely resembles small-pox in its eruptive distribution. Unfortunately, I only possess three of these photos, but there is a large number

which was taken in Trinidad at the time, and which I do not fortunately possess. Finally, Trinidad, I believe, has recently declared herself to be suffering from some cases of small-pox. It is certainly a curious fact that in every place except Trinidad an eruptive fever of this kind should have been declared to be small-pox although this place was in this area. Undoubted cases of chicken-pox occurred in Barbadoes, chiefly towards the end of our small-pox epidemic, and there were several cases very difficult of diagnosis. But the fact stands out that there were as typical cases of small-pox during the whole of the epidemic as to lead to no doubt as to the nature of the epidemic in Barbadoes at any rate. The mildness of the small-pox epidemic in these islands is a feature which is probably due to the open-air conditions.

Dr. G. C. Low (London) said he had seen in Barbadoes a disease similar to that which prevailed in Trinidad, and he had no hesitation in saying he believed it to be small-pox.

Translation.

ON THE EFFECT OF PLAGUE SERUM IN EXPERIMENTAL PLAGUE INDUCED BY FEEDING.

(From the Royal Institute for Infectious Diseases in Berlin.)

By Dr. H. Hetsch and Dr. R. Otto.

Translated from the German by P. Falcke.

In 1901, by order of the Minister of Instruction, the Institute for Infectious Diseases in Berlin, the Institute for Hygiene and Experimental Therapy in Marburg, and the Hygienic Institute of the University of Königsberg, respectively, undertook extensive experiments on the effect of plague serum prepared in the Pasteur Institute in Paris. The results of these investigations, which included the confirmation of the powers of immunisation and cure by plague serum, from Paris in experiments on animals, were published in the *Jahrbuch*, vol. xi. These experiments were followed by those of E. Martini as to the effects of the same serum in experimental pneumonic plague (*ibid.*, vol. x.). For one method of infection, however, namely, in plague induced by feeding, and which in Nature probably plays the most prominent part in the spread of plague amongst rats, the effects of the plague serum had not been thoroughly tested.

On the suggestion of Prof. W. Kolle, we therefore undertook to demonstrate whether plague serum possessed immunising or curative properties in experimental plague induced by feeding.

The animals employed in these experiments were rats only, as these are the only species of animals in which the infection of the stomach and intestine can be induced with any degree of certainty by feeding with plague material. As will be seen by the control experiments, we succeeded in this manner in originating a fatal plague infection in 86 per cent. of the controls, a percentage that is usually not obtained by other methods of infection.

The experimental animals weighed on an average 120-135 gr., and were left without food for twenty-four hours before the experimental feeding, so that they should be hungry. Rats of the same weight served as controls. A part of these controls received adequate doses of normal horse serum [1] (Experiments 4, 9 to 11 13, 14); while another part received no serum at all (Experiments 1 to 3, 5 to 8, 12). The material used for infection in one series consisted of a number of rats dead of plague; in a second series the rats were fed on milk that had been plentifully mixed with plague bacilli. The milk used was first rendered alkaline, and to every 5 ccm. two large Kolle's agar cultivations (forty-eight hours at 32° C.) were added.

Certain infection was only obtainable with this concentrated mixture.

Before the cadavers and the infected milk were placed in front of the animals, a microscopical preparation of the infected milk, and an organ of the infected cadaver, respectively, was examined to demonstrate the presence of an abundance of plague bacilli; the serum was always infected subcutaneously.

In the first series of experiments (Nos. 1 to 10), the plague serum in doses decreasing from 20 ccm. to 0·0005 ccm. was given in order to confirm the limit of the protective dose for plague induced by feeding. In a second series of experiments (Nos. 11 and 12) the largest dose of serum [2] applicable for these animals was simultaneously applied to several rats, and they were then fed with plague material at various different periods (up to twelve days) after the injection of the serum, in order to prove the duration of the protection afforded by the serum.

Finally, another series of experiments (Nos. 13 and 14), arranged so that the animals were first fed with plague material and later received doses of the Paris serum was tried, so that the curative powers of the latter might be tested.

As during the course of our investigations the percentages of the affected controls and the effect of the serum proved that the degree of infection, produced by plague cadavers, was not quite the same as its feeding with pure plague cultures mixed with milk, we undertook to differentiate the manner of experiment in compiling the results.

After the experimental animals and the control animals had received no other food for twenty-four hours than the plague-infected material set before them, they were after each feeding placed in fresh cages to avoid the possibility of their becoming subsequently infected by any of the plague food clinging to the cage. Each animal that died was examined in order to prove if death was due to plague infection, and the conditions found were always so typical

[1] The plague serum used in our experiments was obtained from horses by immunisation.

[2] Earlier experiments had proved that the introduction of only 3 ccm. induced serious collapse or even death in some of the animals, and that, besides, the immunising effect even in this large dose becomes uncertain.

TABLE I.

Demonstration of the Outside Protective Dose in Feeding with Plague Cadavers.
(Concurrent Serum Injection and Feeding.)

Experiment No.	No.	Kind of the Experimental Animals	Injection of Serum: Date	Injection of Serum: How given	Injection of Serum: Dose, ccm	Food: Date	Food: Material	Result: Serum Animals: Living	Result: Serum Animals: Dead	Result: Controls: Living	Result: Controls: Dead	Number of Days after which Death took place
1	3	Rats	15. I.	Subcut.	Paris Plague ser. 2·0	15. I.	Cadaver	3	0	—	—	
	3	,,	,, ,,	,,	1·0	,, ,,	,,	3	0	—	—	
	3	,, Contr.	—	—	—	,, ,,	,,	—	—	—	3	4, 5, 8
2	2	,,	20. I.	Subcut.	Paris Plague ser. 1·5	20. I.	,,	2	0	—	—	
	2	,,	,, ,,	,,	1·0	,, ,,	,,	2	0	—	—	
	2	,,	,, ,,	,,	0·5	,, ,,	,,	1	1	—	—	7
	2	,,	,, ,,	,,	0·3	,, ,,	,,	2	0	—	—	
	2	,, Contr.	—	—	—	,, ,,	,,	—	—	0	2	3, 3
3	2	,,	12. III.	Subcut.	Paris Plague ser. 0·5	12. III.	,,	1	1	—	—	4
	2	,,	,, ,,	,,	0·1	,, ,,	,,	2	0	—	—	
	2	,,	,, ,,	,,	0·05	,, ,,	,,	1	1	—	—	5
	2	,,	,, ,,	,,	0·01	,, ,,	,,	0	2	—	—	4, 6
	2	,, Contr.	—	—	—	,, ,,	,,	—	—	0	2	4, 4
4	2	,,	25. IV.	Subcut.	Paris Plague ser. 1·0	25. IV.	,,	2	0	—	—	
	2	,,	,, ,,	,,	0·5	,, ,,	,,	2	0	—	—	
	2	,,	,, ,,	,,	0·1	,, ,,	,,	2	0	—	—	
	2	,, Contr.	,, ,,	,,	Paris Horse ser. 1·0	,, ,,	,,	—	—	1	1	3
	2	,, Contr.	,, ,,	,,	0·5	,, ,,	,,	—	—	1	1	13
	2	,, Contr.	,, ,,	,,	0·1	,, ,,	,,	—	—	0	2	5, 6

TABLE II.

Demonstration of the Outside Protective Dose in Feeding with Infected Milk.
(Concurrent Serum Injection and Feeding.)

No. of Experiment	No.	Kind of Experimental Animal	Injection of Serum: Date	Injection of Serum: How given	Injection of Serum: Dose, ccm.	Food: Date	Food: Material	Result: Serum animal: Living	Result: Serum animal: Dead	Result: Controls: Living	Result: Controls: Dead	Number of Days after which Death took place
5	2	Rats	4. III	Subcut.	Paris plague ser. 0·5	4. III.	Infect. milk	2	0	—	—	
	2	,,	,, ,,	,,	0·3	,, ,,	,, ,,	2	0	—	—	
	2	,,	,, ,,	,,	0·1	,, ,,	,, ,,	2	0	—	—	
	2	,, Contr.	—	—	—	,, ,,	,, ,,	—	—	0	2	3, 3
6	2	,,	10. III.	Subcut.	Paris plague ser. 0·3	10. III.	,, ,,	2	0	—	—	
	2	,,	,, ,,	,,	0·1	,, ,,	,, ,,	2	0	—	—	
	2	,, Contr.	—	—	—	,, ,,	,, ,,	—	—	1	1	5
7	2	,,	27. II.	Subcut.	Paris plague ser. 0·05	27. II.	,, ,,	2	0	—	—	
	2	,,	,, ,,	,,	0·02	,, ,,	,, ,,	2	0	—	—	
	2	,,	,, ,,	,,	0·01	,, ,,	,, ,,	2	0	—	—	
	2	,,	,, ,,	,,	0·005	,, ,,	,, ,,	1	1	—	—	6
	2	,,	,, ,,	,,	0·001	,, ,,	,, ,,	1	1	—	—	5
	4	,, Contr.	,, ,,	,,	—	,, ,,	,, ,,	—	—	2	2	5, 5
8	2	,,	9. III.	,,	Paris plague ser. 0·001	9. III.	,, ,,	1	1	—	—	6
	2	,,	,, ,,	,,	0·0005	,, ,,	,, ,,	0	2	—	—	5, 7
	2	,, Contr.	—	—	—	,, ,,	,, ,,	—	—	1	1	6
9	2	,,	7. IV.	Subcut.	Paris plague ser. 1·0	7. IV.	,, ,,	2	0	—	—	
	2	,,	,, ,,	,,	0·5	,, ,,	,, ,,	2	0	—	—	
	2	,,	,, ,,	,,	— 0·2	,, ,,	,, ,,	2	0	—	—	
	2	,, Contr.	,, ,,	,,	Normal horse ser. 1·0	,, ,,	,, ,,	—	—	0	2	3, 4
	2	,, Contr.	,, ,,	,,	0·5	,, ,,	,, ,,	—	—	0	2	3, 3
10	2	,,	2. IV.	,,	Paris plague ser. 0·05	2. IV.	,, ,,	2	0	—	—	
	2	,,	,, ,,	,,	0·01	,, ,,	,, ,,	0	2	—	—	4, 8
	2	,,	,, ,,	,,	0·005	,, ,,	,, ,,	0	2		—	4, 4
	2	,,	,, ,,	,,	0·001	,, ,,	,, ,,	0	2	—	—	4, 6
	2	,, Contr.	,, ,,	,,	Normal horse ser. 0·05	,, ,,	,, ,,	—	—	0	2	4, 6
	2	,, Contr.	,, ,,	,,	0·01	,, ,,	,, ,,	—	—	0	2	4, 4
	2	,, Contr.	,, ,,	,,	0·085	,, ,,	,, ,,	—	—	0	2	4, 4
	2	,, Contr.	,, ,,	,,	0·001	,, ,,	,, ,,	—	—	0	2	4, 4

that microscopical preparations always confirmed the diagnosis.

In considering the results of the curative serum, we must first state that in Experiment 13 one cannot speak of an actual "curative effect of the plague serum." As the tables show, the disease in this manner of infection was so slow in its course that the animals were still in the incubation stage fifteen hours after feeding, and, at the time the serum was injected, they exhibited no morbid changes that could be demonstrated macroscopically. Therefore the injection of serum fifteen hours after feeding with plague material may be regarded as a protective measure for the tissues that are not yet infected.

On the other hand, Experiment 14 demonstrates the largest doses possible have no curative effect once large numbers of the plague bacilli have invaded the glands.

If we now put these two experiments on one side and only consider the protective effect of the serum, the following figures are arrived at from the experiments. Ninety rats were fed with infected cadavers of which 64 = 71·1 per cent. remained alive, whereas 26 = 28·9 per cent. died. Of the control animals, 51 in number, 43 = 84·3 per cent. died. These figures, giving the results of the first twelve experiments, demonstrate a *distinct protective action* of the Paris plague serum in regard to experimental plague induced by feeding.

On comparing the figures of experiments 1—4 and 11 (feeding with plague cadavers), with those of experiments 5—10 and 12 (feeding with infected milk) the following results are observed:—

Fed with	Experimental Animals			Controls		
	Infect.	Living	Dead	Infect.	Living	Dead
		%	%		%	%
Plague cadavers	36	25 = 69·4	11 = 30·6	21	3 = 14·3	18 = 85·7
Infected milk	54	39 = 72·2	15 = 27·8	30	5 = 16·7	25 = 83·3

As these relative percentages show, the infection caused by feeding with cadavers is apparently much more certain than infection with milk mixed with plague bacilli. Moreover, the slighter effect of the serum proves that the infection by feeding with cadavers must be a more *severe* one; for, whereas in this manner of infection even 0·5 ccm. of Paris plague serum affords no protection from a fatal infection (experiment 2), in the infection with the contaminated milk much smaller doses (0·01 ccm. in experiment 7) affords sufficient protection. Moreover, our investigations showed that in cadaver-feeding the protective action of the serum only lasted three days (experiment 11); whereas in infection with contaminated milk it was demonstrable for eight days. The former mode of infection must, therefore, be regarded as the more severe.

The reason for this result may be found in the circumstance that in this mode of infection the rats

TABLE III.

Demonstration of the Duration of the Protective Action in Feedings with Plague Cadavers (Experiment 11) and with Infected Milk (Experiment 12).

(Injection of Serum at Various Times before the Feeding.)

No. of Experiment	No.	Kind of Experimental Animal	Serum Injection: Date	Serum Injection: How given	Serum Injection: Dose, ccm.	Food: Date	Food: Material	Result: Serum Animals: Living	Result: Serum Animals: Dead	Result: Controls: Living	Result: Controls: Dead	Number of Days after which Death took place
11	1	Rats	26. III.	Subcut.	Paris plague ser. 2·0	28. III.	Cadaver	1	0	—	—	
	1	,,	,, ,,	,,		29. ,,	,,	1	0	—	—	
	2	,,	,, ,,	,,		30. ,,	,,	0	2	—	—	6, 6
	2	,,	,, ,,	,,		3. IV.	,,	0	2	—	—	5, 11
	2	,,	,, ,,	,,		5. ,,	,,	0	2	—	—	3, 4
	1	,, Contr.	,, ,,	,,	norm. horse ser. 2·0	28. III.	,,	—	—	0	1	3
	1	,,	,, ,,	,,		29. ,,	,,	—	—	0	1	4
	2	,,	,, ,,	,,		30. ,,	,,	—	—	1	1	4
	2	,,	,, ,,	,,		3. IV.	,,	—	—	0	2	3, 3
	2	,,	,, ,,	,,		5. ,,	,,	—	—	0	2	4, 5
12	2	,,	1. II.	,,	Paris plague ser. 2·0	1. II. abduct (after 12 h.)	Infect. milk	2	0	—	—	
	2	,,	,, ,,	,,		2. II.	,,	2	0	—	—	
	2	,,	,, ,,	,,		3. ,,	,,	2	0	—	—	
	2	,,	,, ,,	,,		5. ,,	,,	2	0	—	—	
	2	,,	,, ,,	,,		7. ,,	,,	2	0	—	—	
	2	,,	,, ,,	,,		9. ,,	,,	2	0	—	—	
	2	,,	,, ,,	,,		10. ,,	,,	0	2	—	—	3, 8
	2	,,	,, ,,	,,		13. ,,	,,	0	2	—	—	4, 7
	8	,, Contr.	,, ,,	,,		1. ,,	,,	—	—	1	—	3, 3, 3, 4, 4, 6, 8

TABLE IV.

CURATIVE EXPERIMENTS (SERUM INJECTION AT VARIOUS TIMES AFTER FEEDING).

No. of Experiment	No.	Kind of Experimental Animal	Serum Injection: Date	Serum Injection: How given	Serum Injection: Dose, ccm.	Feeding: Date	Feeding: Material	Result: Serum Animals: Living	Result: Serum Animals: Dead	Result: Controls: Living	Result: Controls: Dead	Number of Days after which Death took place
13	2	Rats	24. IV. (15 hours after food)	Subcut.	Paris plague ser. 2·0	23. IV.	Cadaver.	2	0	—	—	
	2			,,	1·0	,, ,,	,,	2	0	–	—	
	2	,, Contr.		,,	Normal horse ser. 2·0	,, ,,	,,	—	—	0	2	3, 3
	2	,, Contr.		,,	1·0	,, ,,	,,	—	—	0	2	3, 3
14	4	,,	24. IV. (36 hours after food)	,,	Paris plague ser. 2·0	,, ,,	Infect. milk.	0	4	—	—	3, 4, 5, 5
	4	,, Contr.		,,	Normal horse ser. 2·0	,, ,,	,,	—	—	0	4	3, 3, 3, 4

may injure their mouths whilst tearing at and gnawing the cadavers, and that thus the plague bacilli are inoculated deep into the tissues through these wounds, whereas in taking the infected milk the bacilli mostly reach the stomach direct, and are there killed. The invasion of plague bacilli through the intact mucous membrane of the mouth, as may be assumed is the case in animals fed with milk, must naturally take place more slowly than through wounds; and the plague serum circulating in the blood must, therefore, in the former case commence sooner to develop its bactericidal powers on the germs that have penetrated most readily.

In addition, a second circumstance comes under consideration which renders the cadaver infection the more severe, namely, the mixed infection. If the rats in gnawing the bodies happen to have injured the mucous membrane of the mouth, and then continue still to gnaw at the decomposing mass, other bacteria have the opportunity to penetrate into the wounds. As a matter of fact, as we always prepared streak specimens stained according to Gram in all our examinations, we were able to demonstrate mixed infection with streptococci in many rats that had died after feeding on cadavers, but were never able to demonstrate this in rats that had succumbed after feeding with milk. Kolle and Otto[3] had incidentally demonstrated by earlier experiments that in such cases Paris plague serum was utterly futile.

The conditions found at the autopsy left no doubt that the infection after feeding with plague material had taken place by three paths :—

(1) Through the mucous membrane of the mouth.

(2) Through the intestinal mucous membrane.

(3) Through the mouth and intestine simultaneously.

By far the most frequent condition found was a primary cervical bubo (infection by mouth), in addition to which an infection of the intestinal canal was found simultaneously in a large number of the dead animals. We have seldom found a purely primary intestinal infection.

A fact that has not been especially alluded to by others, and that therefore struck us as remarkable, was that greater numbers of plague bacilli were found in the liver than in the spleen in animals that had succumbed to food plague (infection of mouth and intestine).

As to the part played by the tonsils, as points of entrance, in plague induced by feeding we found nothing of consequence during our investigations. In two cases of death induced by eating cadavers we discovered an injury of the mucous membrane of the mouth; as a rule, however, such lesions were not observed.

On comparing all the results of the experiments made by Kolle,[1] Martini,[2] as well as Kolle and Otto,[3] on the effect of plague serum on rats, it will be found that our experiments show the highest percentage of rats kept alive by the injection of plague serum. This is explained by the fact that our method of infection was in the first place a less certain one than that of the other authors (15·5 control animals remained alive in our experiments), and in the second place the infection we induced was also less severe. On the one hand in experimental plague induced by feeding the number of plague bacilli introduced would be relatively smaller than, for instance, in inhalation. On the other hand, the process of penetration would be much slower in its course than, as for example, in inoculation with the hollow needle or in intraperitoneal injection, because in plague induced by feeding the exciter of plague must invade the body without any demonstrable injury of the mucous membranes of the intestinal tract.

Our experiments demonstrated that the subcutaneous dose of 1·0 ccm. of Paris plague serum sufficed to protect the animals fed with plague cadavers from fatal plague infection; while 0·01 ccm. was sufficient to save those fed on contaminated milk. Moreover, as regards the duration of the protective action of the tested serum to food-plague, it was found that the subcutaneous injection of 2 ccm. was a certain protection in the cadaver fed for three days and in milk fed for eight days. In addition to this life-saving action it cannot be denied that the serum also prolongs life in those animals that nevertheless ultimately perish from the infection (experiment 2, 10, 11). Our experiments also show (experiment 4), that normal horse serum in large doses possesses a certain protective power, to which fact Kolle and Martini have already called attention.

It has been shown above, and the results coincide with those attained by the investigators mentioned, that a curative action in the strict sense of the word, has never been accomplished, even with large doses of the Paris plague serum, once infection by means of feeding with plague material has set in.

The opinions of the authors are almost unanimous as to the possibility of man becoming infected by the introduction of the plague bacillus into the stomach and intestinal tract.

It is true that Wilm[4] formerly asserted that during the epidemic of plague in Hong Kong he saw frequent cases of actual primary intestinal plague, but the correctness of these observations has with justice been denied by most authors, more especially by Albrecht and Ghon,[5] though others again, such as Müller and Poech,[6] Dieudonné[7] and Musehold,[8] are of opinion that the possibility of the occurrence of primary plague of the intestinal canal in man is not excluded according to the results of experiments on animals.

Although intestinal plague plays a very inconsiderable part in human pathology, many cases have been observed in recent years in which doubtless plague had ensued through infection of the mucous membrane of the mouth (tonsillar plague). As, according to all appearance, this mode of infection occurs more frequently than was formerly thought to be the case, it may be assumed—as far as we may judge from the results of experiments on animals—that a protective action of plague serum would be afforded in such cases.

LITERATURE.

[1] *Berichte über die Wertbestimmung des Pariser Pestserums*, erstattet von Prof. Dr. R. Koch, Prof. Dr. E. v. Behring, Prof. R. Pfeiffer, Prof. Dr. W. Kolle, Dr. Martini. *Klin. Jahrb.*, vol. ix.

[2] Martini, E., *Ueber die Wirkung des Pestserums bei experimenteller Pest-pneumonie. Klin. Jahrb.*, vol. x.

[3] Kolle, W. and Otto, R., *Vergleichende Wertprüfung von Pestserum verschiedener Herkunft. Zeitschr. f. Hyg. u. Infektionskrankh.*, vol. xl.

[4] Wilm, *Ueber die Pestepidemie in Hongkong im Jahre* 1896. *Hygienische Rundschau*, 1897.

[5] Albrecht and Ghon, *Die Beulenpest in Bombay in Jahre* 1897. *Denkschr. d. math.-naturw. Klasse d. kaiserl. Akad. d. Wiss. zu Wien*, vol. lxvi., Part 2 B., Path.-anat. Investigations.

[6] Müller, H. F. and Poech, R., *Die Pest. Handb. der spec. Path. u, Ther. von Nothnagel*, vol. v., 1900.

[7] *Handbuch der pathogenen Mikroorganismen, herausgegeben* von W. Kolle und A. Wassermann, vol. ii., 1903.

[8] *Musehold, Die Pest und ihre Bekämpfung.* Bibliothek v. Coler, vol. viii., 1901.

Klinisches Jahrbuch, vol. ii., No. 3, 1903.

Review.

Tropical Diseases. A Manual of the Diseases of Warm Climates. By Sir Patrick Manson, K.C.M.G., LL.D., M.D.(Aberd)., F.R.S. New and Revised Edition. Cassell and Co., London. Pp. 756. With 150 Illustrations and 2 Coloured Plates.

We have purposely withheld, and for several reasons, a review of this book. We have waited for the pronouncements of our contemporaries, and we cordially agree with the complimentary remarks universally bestowed upon the new edition of Manson's well-known work. Since 1898 three editions of the manual have appeared, and considering the rapid advancement of knowledge in this department of medicine the editions have been issued none too frequently. The author has been responsible, directly or indirectly, for the discovery of several of the new facts contained in this volume; markedly so in additions to our knowledge of the relation of the mosquito to malaria and to filariasis.

The relation of the mosquito to yellow fever infection, the presence of a trypanosome in the blood of man, "an unsuspected route by which *Ankylostomum duodenale* may gain access to the human intestine," are some of the more significant additions to our knowledge since the second edition of the manual was published.

Throughout the book also will be found many important, if apparently minor, additions; yet are they of sufficient importance to necessitate the practitioners in the Tropics to throw aside previous editions of the work as out of date, and, if they wish to keep themselves well informed in their professional work, to read and study the new edition with care and attention.

Any tropical medical literature issuing from Manson's pen must command attention, and a work to which he has devoted time, care and attention, and in which the master mind gives us the records of over thirty years' observation in tropical diseases, is one to be received with appreciation and studied with respect.

Transactions of the South Indian Branch of the British Medical Association, 1903. Vol. x., No. 2. —The following interesting papers were read at the Meeting held at the Museum, Madras, May 30th, 1902: Some recent methods of staining malarial parasites. By Captain C. Donovan, M.D., I.M.S. Anopheles ova and larvæ. By Major E. Hasell Wright, I.M.S. Examination of blood films for filaria. By Captain J. W. Cornwall, M.D., I.M.S. Dengue. By Lieut.-Col. W. B. Browning, M.D., I.M.S. Spontaneous cure of liver abscess. By Major F. J. Crawford, M.D., I.M.S.

In a short article in *American Medicine*, on chronic diarrhœa, the ailment is stated to be due to one or other of the following: (1) To auto-intoxication; (2) to an intestinal lesion; or (3) to deficient gastric digestion. In all cases the primary cause must be treated.

The following prescription has been found effective in chronic dysentery:—

℞ Pulv. ipecacuanha .. .. .. gr. i.
Hydrarg. chloridi mitis .. .. .. gr. $\frac{1}{3}$
Ext. opii .. .. gr. $\frac{1}{15}$
M. Ft. pilula No. i. Sig.: Five to eight pills daily.

Two or three times a week a dose of Rochelle salts taken in hot water before meals will be found useful.

The following powder is commended in chronic intestinal flux:—

℞ Pulv. simarubæ .. .. gr. v.
Pulv. catechu
Ext. krameriæ, āā.. .. .. .. gr. iv.
Bis. subnit. .. .. gr. x.
M. Ft. chart. No. i. Sig.: One powder twice a day before meals.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Dysentery.

ZUR BEHANDLUNG DER DYSENTERIE IN DER TROPEN (The Treatment of Dysentery in the Tropics), by L. Kohler. *Therapeutische Monatshefte*, September, 1903. —The author uses a decoction of cortex granati, cortex simarubæ and logwood for the treatment of dysentery in hot countries and finds the mixture very effective.

HÆMOGLOBINURIC FEVER, WITH SPECIAL REFERENCE TO THE USE OF QUININE, by Walter Shropshire, M.D. (Paper read at the Fifty-fourth Annual Session of the American Medical Association).—The author publishes a report of 202 cases, of which sixty-one were treated without methylene blue, and with only small daily doses of quinine; of these 26·2 per cent. died and 73·8 per cent. recovered: 112 cases were treated with 20 grs. (or more) of quinine, of which 16·9 per cent. died and 85·1 per cent. recovered: four were treated with methylene blue, of which one died and three recovered.

The largest dose of quinine that appeared to produce hæmoglobinuria was 40 grs.; the largest that failed to produce it was 100 grs. On the other hand, the smallest dose that produced it was 4 grs., and in 15 per cent. of the cases no quinine had been administered for twenty-four hours or even longer. The total average dose that appeared to originate hæmoglobinuria was 9·7 grs. per diem.

All the cases had lived in malarious districts for periods varying from three months to some years. All but one gave histories of malarial paroxysms immediately preceding the blackwater form, and all had previously suffered from malaria.

The author, from his observations, concludes that there is preponderating evidence against quinine being the cause of hæmoglobinuria.

Trachoma.

SUBTROPICAL TRACHOMA, by Wright. *Journal of the American Medical Association*, 1903, No. 6.—The author lays particular stress on the peculiarities of subtropical trachoma and discusses the treatment of this troublesome affection. He particularly recommends the application of citrate of copper and has obtained good results from its use.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3. To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

5. Correspondents should look for replies under the heading "Answers to Correspondents."

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CONTENTS.—NOVEMBER 2ND, 1903.

Original Communications.

NOTE ON "MANSONIA" ANOPHELOIDES.

By Lieut.-Col. G. M. GILES, I.M.S. (Retd.)

THE types of the above species, having been deposited in the museum, have now been examined by Mr. Theobald, who writes to me that he regards it as belonging to his new genus *Finlaya*. In the supplementary new volume of his monograph, this genus, described from females only, is provisionally placed among the *Ædominæ*, whereas the appearance of the present species, of which both sexes are to hand, shows it should belong to the *Culicinæ*.

The ♂ being now known to possess long palpi, there remains little to distinguish *Finlaya* from *Mansonia*, except that the former genus has some tufts of scales on the ventral aspect of some of the apical abdominal segments, a character which can hardly be made out in the present species, as it is not pinned, but glued to the card on which it is mounted, so that I left this region undescribed.

Now that we have a ♂ for examination, the principal difference between *Finlaya* and *Mansonia* would appear to be the comparative shortness of the ♂ palpi, which being little more than half the length of the proboscis, make a distinct approach to the *Ædominæ;* but as neither of these genera can be said to be as yet overburdened with species, I should personally prefer to see them combined under *Mansonia*, as the small differences either of scaly armature or length of ♂ palpi do not appear to me more than might very well be regarded as of specific value only : and it appears to me that the making of new genera is to be deprecated, unless the differences are far more striking than these, or there exists an urgent need for subdivision from the unwieldy number of species which a genus may chance to contain.

A RARE CEREBRAL COMPLICATION IN MALARIA.

By P. A. NIGHTINGALE, M D.Edin.
Formerly of Bangkok, Siam.

THE following case seems to me worthy of record, as it illustrates what I believe to be a very rare complication during an acute attack of malarial fever.

Though embolisms by the malarial parasite are not of uncommon occurrence during the paroxysms of the fever, they usually prove fatal owing to their lodging in some capillary of the more important cerebral nerve centres; whereas in this case paralysis of the velum, with some paresis of the vocal cords, followed by a slow but complete recovery, was the only result.

The patient was an army officer, aged 32, who after serving many years in various tropical and subtropical countries without contracting any climatic disease, sailed from Sierra Leone on June 2nd, 1903, after a four months' residence there.

On June 11th and 12th, when in the Bay of Biscay, he felt chilly and out of sorts, and on the morning of the 13th took a "dose" of quinine on landing at Plymouth.

At 2.30 p.m. on the afternoon of the 14th his temperature rose to 104·6° F., and he had all the usual concomitants of an attack of malarial fever; though the face was noticed to be more dusky and congested than in ordinary cases of such a temperature. Active anti-malarial treatment was at once commenced.

The following morning, after a restless night, with intense headache, on attempting to drink some tea it was regurgitated through the nose without warning and with considerable force ; so that for the next few days all liquids had to be taken through a straw with the head thrown well back.

At the same time the voice was noticed to be hoarse and husky, not nasal, the expiratory sounds apparently requiring some special effort to complete them. On examination the fauces were seen to be somewhat congested, the uvula elongated and œdematous, and the anterior half of both vocal cords swollen and puffy, with incomplete approximation on phonation.

Under the usual treatment the temperature fell to normal on the fourth day and remained there.

On the 18th inst., by straightening the neck stiffly out, fluids could be taken slowly and with great care, without the use of a straw. Ten days later liquids could be swallowed with comparative ease, though there had been little or no change in the voice.

About the middle of September—that is, four months after the attack—the voice had regained its natural tone and strength, and the patient could be considered to have made a complete recovery.

Considering that this serious complication arose when the patient had left Sierra Leone for some eleven or twelve days, that he was placed under the best possible conditions to resist an attack of malaria, and that the treatment had already begun, the fact that with a temperature of under 105° such an embolism occurred seemed to point to a special susceptibility on his part to cerebral embolism, and therefore the question of his return to any malarial climate for at least some considerable time had to be taken into careful consideration.

MUNICIPAL SEWERAGE.

By Major Fred. Smith, R.A.M.C.

(*Continued from page* 308.)

Part III.

The System of Drainage and Sewerage (Domestic and Municipal) best suited for Tropical Climates.

The author of this article has assumed that it is intended that the system of drainage should provide for the natives as well as for the Europeans of a community. Apart from considerations of duty to our native dependents, we have to bear in mind that the conditions that make for good health in the one class may be expected to benefit all classes either directly or indirectly.

In selecting a system of drainage and sewerage for tropical climates we are met at the outset by this difficulty, viz., that conditions of climate, soil, rainfall, &c., in tropical countries are not all the same. In some parts of the torrid zone there are torrential deluges during part of the year and absolute dryness during the remainder. In other regions the rain is more evenly distributed. The total rainfall varies within very wide limits in countries not very far distant from each other, thus: In the Gold Coast Colony, at Accra, the annual rainfall is about 17 inches, whereas in Sierra Leone or Freetown, 140 inches of rain fall in the year. This, of course, affects the general water supply in the way of streams and rivers, so that while Accra is always more or less short of water, Sierra Leone possesses this precious liquid in abundance. In some places the sun is generally hot, the humidity of the air slight, and evaporation in consequence rapid; in others the reverse is the case, and for part of the year water dries up so slowly that a cupped dead leaf may contain the fluid continuously for weeks. The soil, again, may range from the rocky and impervious to the sandy and absorbent. The surface of the ground may be flat or hilly—a few feet only above sea-level or of great altitude. The two last-mentioned variations, however, are not peculiar to the Tropics.

The habits of the people may be totally different in one country to what they are in another.

It follows, therefore, that systems of sanitation designed for one part of the world may be unsuitable for other parts.

In this article, then, I shall endeavour to set forth clearly the main principles which should guide us in tropical sanitary undertakings and afterwards lay down a scheme suitable for one tropical region with which I am well acquainted. Such modifications of the system as may appear desirable to meet the wants of other types of countries and communities may be then deduced.[1]

Diseases likely to be Affected as to their Prevalence by Drainage.—Before proceeding further it will be as well to briefly discuss such diseases met with in the Tropics as are likely to be affected as to their prevalence by any system of drainage or sewerage. For the purposes of the article I shall take it that the term "sewerage," which is commonly associated with sewers, is really intended to include dry methods such as, for instance, the "dry earth system."

Enteric fever, malaria, dysentery, cholera, filariasis, yellow fever and (possibly) guinea-worm are the chief diseases which it may be hoped will be diminished in frequency either directly or indirectly by drainage.

Enteric.—Enteric fever has for some years been looked upon as almost entirely a waterborne disease. Among the medical men of the army, however, an opinion has long prevailed that many of the cases which are dealt with in their practice cannot be accounted for unless some agency other than water exists. This opinion, coming from a body of specially trained sanitary experts, each individual of which may be looked upon as a Medical Officer of Health, does not seem to have attracted much notice outside. The much neglected annual report of the Army Medical Department contains many well thought out reports on this subject, but this article is not the place in which to go deeply into etiological matters. Recent experiments, however, have shown clearly enough that a community cannot rest satisfied that it is enteric-proof merely because it may have provided a pure water supply for its members. For all that, there is little room for doubt that enteric is carried into the human body mainly by water in some form.

The typhoid bacillus thrives for some time in organically polluted water, and, according to Busquet, more especially in the sediment of such water. It also lives in organic refuse of all sorts and in polluted soil. Major Firth, Professor of Hygiene at the Army Medical School, and his assistant, Major Horrocks, R.A.M.C., in a paper presented at the last (1902) annual meeting of the British Medical Association,[2] showed clearly that it has more

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[1] The question of making a profit by the use or sale of excreta has been left entirely out of consideration in this article.

[2] *British Medical Journal*, September 27th, 1902.

viability under adverse conditions than had previously been thought to be the case. It exists for weeks in the soil, even when the soil is dried. It may therefore be blown about from place to place along with bits of fæces, dried earth, &c., especially in the sudden tempestuous hurricanes of the Tropics. The Netley professors demonstrated, moreover, that the statements which have been made from time to time as to the agency of flies in carrying about typhoid germs have foundation in fact. The British army surgeons had in Egypt and elsewhere reported the spread of enteric by flies, and in the *Medical Record* for September, 1898, American surgeons made similar observations. The reason it was noticed so little in England is difficult to account for, unless it is because flies are less common. It was well known enough, by inference, to the army sick attendants who knew nothing of bacteria. Some years ago in South Africa a ward orderly pointed out to me what I had often enough observed for myself, viz., flies pouncing upon enteric fæces in the bed-pan taken from under a patient, and when driven off settling on the milk cups, patients' lips, &c. The thing was so obvious that nobody seems to have thought it necessary to prove it experimentally till last year. In *Public Health*, December, 1898, in is an account of a small experiment proving that flies can carry diphtheria bacilli, and the Editor in a footnote thereto, shows that he at least was familiar with the army idea that enteric could be conveyed in the same way. In a paper on enteric fever in Sierra Leone, read at the same meeting as Professor Firth's paper, is mentioned a case in which it seemed that the typhoid bacillus had been carried on the person or belongings of a woman for three months before it got into her system, and caused an attack of fever.[1]

It is open to question whether the bacillus exists long in any given volume of water—presumably, its own poisonous secretions must be carried off and fresh supplies of water full of organic matter provided in order to keep it going for very long.

As for the supply of bacilli from the human body for infection of water, soil, &c., they are excreted with the fæces, and in pneumonic cases probably with the sputum. Professor A. E. Wright and Major D. Semple—pathologists of the Army Medical School—showed some years ago,[2] moreover, that the urine of typhoid fever patients contains the bacilli, and this has since been confirmed by Dr. Horton Smith and others. It may be supposed, indeed, that, owing to the indiscriminate way in which people micturate in all sorts of places, the urine is the cause of enteric outbreaks more frequently than the fæces.

Any system of drainage for the Tropics, then, should be calculated to do away with the danger of direct infection of water, soil, refuse, &c., by the fæces, urine, or sputum of typhoid fever cases, and of their indirect contamination by the bodies, or by the soiled linen of such patients; this last resolving itself chiefly into a means of harmlessly removing the water in which patients and clothes have been washed.

[1] *British Medical Journal* September 20th, 1902.
[2] *Lancet*, July 27th, 1895.

Malaria.—Malaria is only secondarily affected by systems of drainage and sewerage, and then only if these be designed also to remove surface water. In the latter case it may be expected that the drainage would diminish the number of breeding waters for Anopheles mosquitoes.

Filariasis, Yellow-Fever, &c. — The remarks under malaria apply also to filariasis and yellow fever in connection with the breeding places of their particular mosquito hosts.

Dysentery.—Dysentery is supposed to be conveyed by drinking water, but exactly to what extent and in what manner has not yet been accurately determined. Assuming that it is a waterborne disease, and that the infecting material exists in the fæces, the considerations applying to enteric fever will meet also the case of this complaint. Manson, in "Tropical Diseases" (1900), says, "One thing, however, is fairly well ascertained, and that is that these germs, whatever they may be, are often introduced by means of drinking water." There is little doubt the disease is also connected in some way with insanitary conditions such as are apt to be found in standing camps.[3] This fact has been recognised ever since camps came to be written about. The military writers of the eighteenth century and the last century were quite clear on this point, and it seemed sometimes to be unconnected with the water supply. The bacteriology of the disease has not yet been worked out—it remains to be proved whether there are several varieties of dysentery—whether the amœba coli, the colon bacillus, Shiga's bacillus, Durham's coccus, and the other organisms put forward in this connection by various observers, are each or any of them casually related to the disease.

Cholera. — Cholera is largely waterborne. In my opinion, however, it is not exclusively so. Cases coming from an infected place have been so long in developing the disease as to lead me to believe that the victims had carried the disease about with them for some time before they became infected.

The bacillus has, as far as is known, a feeble saprophytic existence, and soon dies out even in water. An infected well does not long remain infectious, though nothing may have been done by way of purifying the water. Here, again, the fæces are the principal (and probably only) source of infection.

General Ill-health for Want of Drains, &c.—In addition to the above-mentioned specific ailments, there are to be borne in mind diarrhœa, ankylostomiasis, bilharzia, the newly announced trypanosoma disease, fevers of various unnamed kinds, diphtheria, sore throat, tonsillitis, dyspepsia, anæmia, &c., and general loss of tone, bringing about some of the above and the condition known as debility; some of these affections we are accustomed to regard as signs of general ill-health, most prevalent among people living amid insanitary sur-

[3] An old idea of some Anglo-Indian surgeons was that dysentery could be caught by using the same latrine as a dysentery patient. There may be something in this. Experiments on animals have shown that the disease can be inoculated *per rectum*. The ubiquitous fly may therefore be a dysentery inoculator in open camp latrines.

roundings, which encourage the growth of the bacillus coli and various septic organisms, nematodes, &c.

A well-drained, well-sewered locality will have a purer, sweeter air than one badly drained, and though we cannot say exactly why it is so, we are all of us fully conscious of a general feeling of well-being when we live in such a healthy atmosphere, whereas in the close, heavy sensation noticeable in what we call an unhealthy air we are prone to be lax, depressed, to have a bad appetite, and in a general way to feel, as we say in the vulgar tongue, "not up to the mark."

Plague.—I might have mentioned plague as indirectly connected with insanitary conditions, dependent on drainage and, more directly, in connection with refuse heaps and so forth, encouraging the multiplying of rats and other vermin.

Having said thus much as to that we seek to avoid, I may now mention the chief systems of drainage and sewerage, from which it is open to me to select the one which I consider most suitable to the needs of the Tropics, beginning with the primitive forms of sanitation and passing on to the more highly developed modern plans of dealing with excreta and other deleterious matter.

Domestic Drainage and Conservancy.

Households, Drainage of.—The following are the chief household systems of conservancy, drainage, &c.:—

(1) The bush or open ground.
(2) The latrine trench, pit, or place.
(3) The river or sea.
(4) The privy.
(5) The pail—with or without dry earth.
(6) The water closet discharging into cesspool.
(7) The water closet, discharging into water system.
(8) House drainage for surface water, slops, &c.
(9) Refuse, disposal of.

(1) "*The Bush.*"—The bush system, by which is meant passing the excreta directly on to a convenient plot of ground, is in general use chiefly, but not entirely, among uncivilised communities. In those places, however, in which it is recognised among civilised people, it is only for the use of the natives employed by the whites.

Even this system, bad as it may appear at first glance, is not quite so hopeless as might be imagined, especially in open country districts, where there is no necessity to accumulate excreta in one spot. It has been a matter of surprise to me to find scarcely any fæcal odour in the neighbourhood of a good-sized native village where this plan has been in vogue for years. Each particular deposit of fæces is removed so quickly by various natural agents day by day that no great nuisance results. The evil of such practice is, of course, that in the majority of cases the village is near a river or stream, which is inevitably polluted.

When this plan is adopted for natives ruled by a white community in a large town the conditions are different and a good deal of nuisance results. The system has been allowed not so much from unwillingness of the whites to provide proper accommodation for their back servants and workmen, as from their inability to induce the blacks to use any accommodation so provided. To a son of the plain or bush the departure from the custom of attending to the calls of Nature in a retired spot in the open air, in favour of our fashion of accumulating our excreta in an odorous privy, is most distasteful; for that matter it is quite natural in a man who does not know or cannot bring himself to believe that disease may be caused by his practices. The white man, therefore, adopts the lesser of two evils, and in order to prevent the blacks from defiling his premises, and the town generally, he appoints a place a mile or so outside the town, a field to which the native is ordered to go for his daily evacuations. Such fields have been provided in some parts of South Africa. Not many years ago near an important city in that part of the world I inadvertently entered the "bush" when making a short cut across country, and I shall never forget it. But as far as I know it was productive of no evil to the inhabitants of the town, and there is no reason why such a place should do harm if care has been taken in the selection of the spot. The danger would be to other communities towards which this place drained. To a smaller extent also villages and farms near enough to be affected by heavy dust from the field might suffer. . . . The users of the place are not likely to bring back anything on their feet, as they are more dainty, in respect to things of that kind, than Europeans. How the native manages on a dark night or when he was ill I do not know. But it is not my intention to advocate such a plan for general acceptance; nevertheless, inasmuch as any system adopted, must, I take it, provide for natives as well as for Europeans, it may still be found essential to recognise and provide for some such practice when we have to arrange for a large and intractable coloured population which is very much averse to more civilised customs.

(2) *Latrine Trenches.*—The trench or hole in the ground may be a privy or cesspool if it is large and used as a permanent place. The latrine proper I take to be the temporary excavation in the soil, intended to be filled up again with earth after it has been used for a short time as a receptacle for fæces. It is mostly in use for bodies of people suddenly assembled in places where there are none of the ordinary conveniences available, such as military camps, railway works, and so forth.

A trench about 2 feet wide, 2 to 4 feet in depth, and as long as may be required, is made in the ground. The earth thrown out is the base for a screen of bushes at the back, and a pole seat is fixed up in front.[1] Latrines of this kind, but enclosed in a wooden fence, were used in the Parks by the troops on Coronation duty in 1902. In the Army the usual order is that every man should cover his own excreta with earth. —this order is rarely more than half obeyed. A man is also told off to visit the place at intervals and cover up everything in the trench with two or three inches of earth. This is never done regularly or properly unless some one in higher authority makes it his business to see that the man does his work. Separate pits ought to be provided for urine, but they rarely are.

The users are apt to soil the ground with fæces at

[1] "Regulations and Instructions for Encampments," Section 16. War Office, 1895. Eyre and Spottiswoode.

the edges of the trench—the edges should be chipped into the trench daily. The ground for a foot or so in front of the trench is invariably soiled with urine, this is covered copiously with chloride of lime or other disinfectant powder daily, and finally with earth when the trench is abandoned. At night the men are apt, owing to rain, laziness, security from detection in the darkness, fear of enemies (ghostly and material), illness, &c., to relieve themselves on the ground somewhere in the direction of the trenches.

In South Africa I endeavoured to have this system rigidly carried out in one regiment, and had urine pits fairly close to the tents—nearer than the latrines. Men in reliefs were told off to cover contents every half hour in the day and put plenty of lime round about—all in the hope of keeping off flies and dung beetles. It was only by constant, wearying supervision that any approach to efficiency was maintained.

If thoroughly carried out this system is the best I know of for camps—but there should be some provision for the night and for urine more than the usual number of pits. The carrying out, however, in this as in so many plans, is just the difficulty. Well done it gives rise to scarcely any nuisance in the way of odour, and the excreta being buried on the spot are safely out of the way of doing harm—at any rate for some time, as the ground is not likely to be dug over until all traces of the grave-like latrines have disappeared—and with a suitable selection of site no danger need be apprehended in the way of water pollution. Ill done, the trench becomes an open privy with an infected surface soil around it, the flies browse in it in the day time and occupy the men's tents at night. On visiting a deserted camp during the recent campaign it was common to find half a dozen or so open latrines containing a fœtid mass of excreta and maggots. This because the responsible persons so often failed to comply with the regulations for encampments by filling in latrines on the departure of the troops.

Here we may leave this subject. It is not likely that the latrine trench will be recommended for city communities, for want of the necessary waste land; withal it seems to the writer that a brief mention of the method is not out of place in this article.

(3) *The River System.*—The river system—by which I mean the passage of excreta by individuals direct into a river or stream or into the sea—is common in some parts of tropical Africa and Malaya. It still prevails, too, in some English country districts and probably in many other lands as well. In West Africa (among the Mendi people in the hinterland of Sierra Leone for instance) the people go into the stream when it is shallow enough, at other times they perch on a rock or on the bank. The more timid and retiring women and children seem to prefer the wooded bank close to the water, and in flood times, for obvious reasons, everyone favours the bank.

In England I have come across some closets erected over small brooks and others on the banks, so that excreta passed into the water. This procedure is economical enough for the householder, but that is the only thing that can be said in its favour. It is absolutely unsafe and ought soon to be a thing of the past. It is more insidiously dangerous than the pollution of rivers by large volumes of sewage, in that it does not usually create any obvious impurity of the water. I have in mind now a rippling, clear-watered brook of the poetical type, with gravelly bed and fringes of water-cress, forget-me-not, &c.; the sight of this stream would make a wayfarer thirsty, yet it was, and probably is, being steadily fouled throughout the year in the manner above described.

The direct passage into sea-water is common near the mouths of rivers and on the borders of creeks. In primitive countries it is usual to go on to the beach to evacuate. In the Malay country where towns are built on piles some little distance from the land, everything goes into the water. In some other tropical countries closets are purposely built in such positions that the evacuations pass either into the sea or on to a part of the shore which is daily washed by the tide. This is the same as in Europe of course, and we commonly lead the sewage of cities into estuaries, harbours and so on. The evils thereof will be referred to under the head of municipal sewerage.

Some curious results of the survival of these customs have come under my notice. In Malaya some natives who had left the sea front to reside at the back of a large town had erected little retiring houses on piles on the land. The excreta dropped through the floor on to the ground, where they remained in an unpleasing heap. This survival of a Malay custom is also seen in the houses of many of the people; they are raised to some height, and all sorts of rubbish passing through the floor—sometimes purposely a mere lattice work in the kitchen part of the dwelling—create a foul smelling mess underneath the house: there is no sea to remove the filth.

At one of our English seaport towns the same kind of thing came to my knowledge recently. An old-time small fishing hamlet on a creek had become a part of a large modern town. With the building of sea-walls, houses, railways and so forth, the creek had disappeared as far as holding sea-water is concerned; but the old closets arranged so that excreta might pass direct into the creek were still in use—the filth instead of going out to sea accumulated on the dry land, a good deal soaking into the ground and a friendly rain-storm removing a little now and again.

The above methods take no account of slop water, which is generally, in places such as those described, thrown on to the ground or into a stream.

We now come to something in more general use among civilised peoples both in town and country.

(4) *The Privy.*—The privy, privy-midden (or cesspit) varies in character. (The term cesspit or cesspool is sometimes taken to mean only a pit which receives matter drained into it from a smaller privy or from a closet.) It may be a mere hole in the ground or it may be lined with bricks, cement, &c. It is sometimes a built-up chamber with its base at ground level or raised a few inches from the ground. In short, we may say that the word privy includes any receptacle which man can devise for the collection and storing of human excretal matters; but for our purpose we may consider pails as excluded from the above.

Arrangement is sometimes made for throwing ashes and refuse, either or both, into the privy—the ashes being supposed to absorb the fluid part and to deodorise the remainder, thereby inasmuch as the separation of the urine retards decomposition.

Whatever particular form of receptacle be provided it requires emptying at longer or shorter intervals according to its size in relation to the number of persons using the closet.

The removal of the contents in is some cases carried out by the local sanitary authority, in others it is left to the occupiers. If by the former, the emptying is at stated intervals; if by the latter, more commonly, when necessary owing to the receptacle being full. The interval, therefore, varies between a week and some months, or even years.

A large hole in the ground, if the soil be porous and not waterlogged, takes an astonishing length of time to get filled by one or two households.

The style of thing mostly recommended where privies are to be used is a small watertight pit, protected from the entrance of rain water and raised half a foot or so above the level of the surrounding ground. Such a privy is supposed to be emptied every week or few weeks as the case may be.

Unless ashes or some drying absorbent material in considerable quantity is put into the privy the contents are always more or less fluid owing to the admixture with urine.

In the process of removal, the contents are scooped by means of special shovels or pails into carts and disposed of in one of many ways (when privately removed they are sometimes disposed of either by burying or by use as manure on the premises of the occupier; more rarely by a destructor). The ideal cart for such a purpose is watertight and covered—a lid at the top permitting access to the interior. The methods of ultimate disposal will be discussed under the head of municipal sewerage; for the methods of the contractor are much the same as those of municipalities in these matters.

The evils of the privy system lie in the necessity of removal of contents, in the danger of contaminating well water by the pollution of the surrounding soil, and in the production of an unpleasant heavy fæcal odour in the air near the privy.

The watertight receptacle is the only variety which could be safe, and it is very well in theory but is rarely met with in practice; if watertight when first made it does not usually remain so for long.[1]

The removal of the contents is scarcely ever achieved without fouling of the ground somewhere between the privy and the cart or other place of destination. Owing to the offensive odours consequent on the disturbance of contents local bye-laws generally require the removal to be effected at night. As a rule the night-soil cart has to remain in the street, or at least some distance from the privy, and the soil is carried from one to the other in pails, which are apt to be dripping small portions of filth from their befouled exterior all the way. The shovels, too, are always fouled. These evils are the more pronounced when ashes have not been used, and the privy contents are semi-fluid. Yet the average householder is quite content when once the scavengers have left his premises and the smell has died out. As to the carts, I shall have more to say further on.

A typical instance of the false security engendered by a merely theoretically perfect system of disposing of excreta was afforded me in South Africa—a case where truly the eye saw not and therefore the heart did not grieve. The head surgeon of a renowned National Hospital (who left home to help the soldiers and did yeoman service, too) proudly escorted me round his large hospital, and descanted upon the perfection of the arrangements. Stress was laid on the fact that all pails and pans of excretal matter were mixed as to their contents with earth, and the mixture carried away into the country to be suitably disposed of so that no harm could be caused to town or troops. What I saw in one direction is here detailed. The chief surgeon could never have seen it himself, I feel sure (he had plenty of other work to do), and I am not aware that he had any special conservancy officer. The pail system (which is next to be described in this article) was in vogue. In a small enclosure behind the building I found the establishment of the man whose duty it was to empty the pails. It was within a yard or two of the main street on to which the yard door opened, and there was the cart awaiting its burden. A stout native was manipulating the pails. He certainly mixed the contents thoroughly with earth in a loosely made wooden enclosure, much like those used by bricklayers' labourers for making mortar, and the resultant mud was of similar consistence to mortar. There was an oozing of the mud through the spaces between the boards, so as to form a fringe a foot or two in width outside the enclosure. The native was actually walking about in this mud (which was hanging about his boots like the mud does on a ploughman's feet). He made frequent journeys to the cart and occasionally excursions into the yard, among the out-buildings near which was the hospital kitchen—contaminated enteric-laden mud from his boots was being deposited in the street and on the footway all day, and taken thence on other feet to all parts. The native's home was probably fouled by himself.

(*To be continued.*)

[1] In some Anglo-Chinese towns the Chinamen's houses have a marvellously built privy. The privy is in the basement of the house and opens up at the roof like a low chimney. The user squats on the edge of this chimney. They rarely require emptying. The Chinese object to our pails as being offensive and entailing intrusion of scavengers into the houses or premises where their women live.

Appointments, &c.

Dr. T. L. Anderson has been deputed by the Government of Western Australia to proceed to India to investigate and report on the plague operations in force in that country.

The Hon. W. H. Greaves, Chief Justice of Barbados, and Dr. G. B. Mason, Medical Officer of the Leeward Islands, have left England for their respective colonies.

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THE

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November 2, 1903.

SIR FRANCIS LOVELL'S SECOND MISSION ON BEHALF OF THE LONDON SCHOOL OF TROPICAL MEDICINE.

The success which attended the previous mission of Sir Francis Lovell, C.M.G., during 1901-1902, has induced the authorities of the London School of Tropical Medicine to again request Sir Francis to start on his travels. Since the previous mission was inaugurated the School has been doubled in size, the pupils have correspondingly increased, and the equipment of the School has in many directions been improved upon. These advances were rendered possible by the goodly sum of money which generous donors contributed. But increased accommodation means increased expenditure, and the School authorities are by no means satisfied that they have reached completeness in their efforts to benefit tropical medicine. A great deal remains yet to be done in regard to equipment, and an unlimited field of research lies open to investigation.

The Seamen's Hospital Society authorities have made a further advance of money to complete the premises, including new laboratories, a lecture theatre, a museum, and increased residential quarters for students. The action of the Seamen's Hospital authorities in this matter is perhaps best described by the word patriotism; for it is in a purely patriotic spirit that they have taken upon themselves this burden. In touch with men serving in all quarters of the globe, and impressed by the variety of obscure and unfamiliar ailments which affect the patients who apply to them for relief, the Seamen's Hospital authorities have extended their philanthropy beyond the walls of their own hospital, and sought to extend the benefits of education to those countries whence their sick and suffering come. In a spirit altogether imperial in its scope they have, with a rare generosity and far-sightedness, grasped the situation, and, believing that the tropical scourges are best met by sending abroad medical men trained in the diseases they are likely to meet with, struck at the very root of the means of affording relief.

But mere bricks and mortar will not benefit humanity: we want men to people the buildings, and it is to obtain the wherewithal to people these commodious buildings with men engaged in research that Sir Francis Lovell is undertaking his mission on behalf of education in tropical disease.

Hitherto the work of the School has been largely tutorial, a most important element in education and calculated to do direct good wherever the trained pupil goes; but there is a branch of the work which has even further reaching influence than mere teaching and training in methods, namely, research. The investigation of the diseases themselves, their nature, their causes and their prevention, can be studied and advanced only in the laboratory, and the results of the study are made known for the benefit of the world at large. To promote research in the laboratories of the London School of Tropical Medicine is a principal object of Sir Francis

Lovell's present mission; and surely never had a missionary a better cause to advocate. Generous as was the last response, the claim upon residents in warm climates was not at that time what it is now. Previously the claim was largely for a more local and limited purpose, namely, the erection of school buildings in London; now the object is to benefit mankind in tropical countries by the study of diseases peculiar to these climates. A truly humanitarian purpose and one well deserving support by all men.

Already generous friends have enabled the School to do something in this direction. The directorship of the Kuala Lumpur Research Institute in the Federated Malay States has been given to the School, but many more similar endowments are necessary, and especially are research scholarships required. A noble example in this direction was set by Mr. Craggs, who generously gave £300 a year for three years as a travelling scholarship. The good which accrued to science by Mr. Craggs' liberality is known to all. We publish with this issue a portrait of the Hon. Bomanji Dinshaw Petit, a man well known not only in Bombay and India, but one whose name has become a household name in Great Britain for his liberality and his wise recognition of the benefits of education—a true citizen of the Empire. The example he has set we hope and expect to see followed. In the Malay Peninsula, Penang, Singapore, Hong Kong, and the various treaty ports in China, there are many of our fellow subjects, Chinese in particular, who take a broad and liberal view of educational matters, as the list of subscriptions in behalf of the School, which we publish in this issue of the Journal, testifies. There are many more however, ready and willing to help if the excellent purpose and great good likely to follow a careful investigation of such diseases, as beri-beri, plague, malaria, dysentery, &c., were explained to them. It is these diseases, and such as these, that hamper traffic, paralyse shipping industries, and ruin many a promising commercial enterprise through the havoc and loss of life they cause amongst both masters and coolies.

PUBLIC HEALTH DEPARTMENT REPORT IN THE TRANSVAAL DURING 1902.

The Transvaal Administration Report for 1902, in Part I., devotes 28 out of 264 pages, of blue book size, to the Public Health of the Colony. The Medical Officer of Health for the Transvaal, Dr. George Turner, states that to draft a health report of the Transvaal is, at present, a hopeless task—at any rate, as far as vital statistics are concerned. It will be remembered that a condition of war obtained in the Transvaal up to June 1st, 1902, and the dislocation of all means of acquiring information in regard to matters of public health readily accounts for Dr. Turner's remark. Valuable information, however, has been collected, and the basis of future work established.

So far as observations go, they show that intestinal ailments—enteric, enteritis and dysentery—caused the greatest number of deaths. Of 2,906 observations recorded, typhus, typhoid and typho-malarial fever accounted for 194 deaths, and dysentery 228. Dr. R. Fox Symons, in his report of Pretoria and district, records 61 deaths from enteritis, 52 being children under five years of age. Diseases of the respiratory system, according to Dr. Symons, caused the greatest number of deaths in the Pretoria district, amounting to no less than 123 out of a total of 486.

At the Leper Asylum at Pretoria, the inmates on January 1st, 1902, numbered 216, and on December 31st, 1902, 230, showing an increase of 14 only. The percentage of the different forms of leprosy is given as: Anæsthetic leprosy, 52·3; nodular, 15·9, and mixed, 31·8. Concerning the causation of leprosy, the influence of heredity is regarded as doubtful; the contagious nature of the disease is maintained, and the evidence of fish being a factor in the spread of leprosy refuted.

It is satisfacory to know that a vaccine factory has been instituted in Pretoria, but the use of calf lymph is not considered so efficient as arm-to-arm vaccination.

The unsatisfactory condition of the water supply in the Witwater's Rand district is commented upon by Dr. C. L. Samson.

Dr. Theiler, in his report of the work done in the bacteriological laboratory at Daspoort, gives a *résumé* of studies in regard to horse-sickness, red-water in cattle, trypanosoma and the diseases caused by it, rinderpest and biliary fever in horses. He considers that to a fly belonging to the genus *Hippobosca* is to be ascribed the spread of trypanosomal diseases.

Analyses and examinations of water, food, alcohol, &c., amounting in all to 860, were undertaken at the Government laboratories, under the care of Dr. W. C. C. Pakes. Of this total, 805 were chemical investigations, 39 were bacteriological, and 16 toxicological.

Considering the chaos caused by the war in the Transvaal the report is highly creditable to all concerned.

The name of the author of the interesting article on "Yerba-Maté," published in the "Journal of Tropical Medicine" on October 1st, 1903, is John William Lindsay, M.B., Ch.B.(Aberdeen), Belén, Paraguay.

British Medical Association.

DISCUSSION ON TRYPANOSOMIASIS.

I.—Sir Patrick Manson, K.C.M.G., M.D., F.R.S., LL.D.

Medical Adviser, Colonial Office and Crown Agents of Colonies.

The subject of trypanosomiasis in man, though a very recent one, has already advanced sufficiently to justify the prognostication made only last year that ere long it would take an important place in tropical pathology. Although there is some ground for the claim that Nepveu was the first to recognise, or rather to see, a trypanosoma in human blood, it was not till Forde and Dutton had placed on record their case from the Gambia Colony that the idea of human trypanosomiasis as a distinct disease was definitely entertained. Only a few months later Daniels and myself recognised the disease in a patient from the Congo. Before this case could be recorded in detail I heard of a third case, also from the Congo, identified by Dr. Broeden, who, along with Dr. Sims, of Leopoldville, had recognised the disease in one or more additional Europeans in that region. Meanwhile Dutton and Todd had been investigating the subject on the Gambia and in Senegambia, and had encountered another European case, and also a number of cases among the natives. Hardly had this announcement been made than Castellani discovered (November 12th, 1902) that the infection occurred among the natives of Uganda. He found the parasite in March, 1903, not only in the blood but also in the cerebro-spinal fluid; and as regards the presence of the parasite in the blood in natives of Uganda, Baker confirmed this observation. Still later, Bruce also has confirmed Castellani's discovery both as regards the blood and the cerebro-spinal fluid. Quite recently Leishman has brought forward a certain amount of evidence that trypanosomiasis occurs in India, and still more recently this evidence has been supported by Donovan. Thus trypanosomiasis in man, which made its *debût* only some eighteen months ago, is thoroughly established as a definite element, and probably an important element, in tropical pathology.

And here I would remark parenthetically that in this matter of trypanosomiasis the formation of a Tropical Section at these meetings of the British Medical Association and the establishment of Schools of Tropical Medicine have received once more their justification. But for the London School of Tropical Medicine Forde would not have been using his microscope in the diagnosis of fevers on the Gambia, and he would not have started the subject by his find of the trypanosoma in the original case; but for the Liverpool School of Tropical Medicine Dutton would not have been on the Gambia to identify, and subsequently to describe and study with such signal success, the organism Forde had found; but for the Tropical Section of the British Medical Association at Manchester last year Daniels and I would not have been shown Forde's case at Liverpool; but for this the disease possibly would not have been looked for and recognised on the Congo by Sims and Broeden; but for the London School of Tropical Medicine Castellani and Baker would not have been using their microscopes to such good purpose in Uganda. In fact, but for our Tropical Schools and Section human trypanosomiasis would not have seen the light perhaps for many years to come. Pardon this digression. Institutions, and even sections of the British Medical Association, are, like men, glad of an opportunity to justify their existence.

The enthusiasm attending the first flush of discovery is apt to carry people off their legs, and to lead even experienced pathologists to conclusions beyond the facts. In such circumstances the amount of speculation and hypothesis is apt to be in inverse proportion to the amount of reliable data. Our care, therefore, should be to accumulate additional facts, and whilst doing so to discriminate carefully in our speculations between the possible and the proved. In that spirit I would ask you to discuss the subject of human trypanosomiasis.

By way of giving a lead I propose to refer to the following points:—

(1) The methods of investigation.

(2) The ascertained clinical features of the infection in (*a*) the European and in (*b*) the native.

(3) The possible relationship of human trypanosomiasis to trypanosomiasis in the lower animals, and to certain obscure tropical diseases—(*a*) sleeping sickness, (*b*) hyperpyrexial fever of West Africa, (*c*) kala-azar and certain forms of splenomegaly common in the Tropics.

(4) Prognosis.

(5) Treatment.

(6) Prophylaxis.

(1) *Methods of Investigation.*—These hitherto are two—examination of the blood with the microscope; inoculation of the lower animals.

In an exhaustive examination of the blood in the Tropics, in addition to enumeration of the various kinds of blood corpuscles, we have to keep in view several distinct types of parasites, filaria embryos, trypanosomes, malaria parasites, spirilla, bacteria. To most easily find or exclude these we have to make use of three degrees of magnification, besides various methods of treating the blood films. Each of these methods is more or less specially appropriate to a particular type of micro-organism. Thus, for filariæ, a very large thick, slowly-dried, unfixed blood film, dehæmoglobinised and stained by immersion in a weak watery solution of an aniline dye, and systematic search with an half inch or three-quarter inch objective is, in my experience, the most reliable method. I am speaking now of ascertaining the presence merely of filarial parasites, not of their critical examination. For malaria parasites, bacteria, or spirilla we should employ very thin, fixed and stained films and a $\frac{1}{12}$ immersion lens. For searching the blood for trypanosomes I consider a moderately thin, fixed, methylene blue, or better, thionine or Romanowsky-stained film, and $\frac{1}{6}$ objective to be the best method.

An important point in the examination of blood films

is the attitude of mind of the observer. He must be on the outlook, intent on finding the particular form of organism he is in quest of; he has, so to speak, to focus his mind as well as his microscope, otherwise he is almost sure to fail in his quest. This is an important matter. I believe from want of this attitude of mental alertness, as well as from using either too high or too low magnifying powers, I have overlooked the trypanosoma many times in the large number of blood films from natives of the endemic region I have examined during the last twelve or thirteen years. We must also bear in mind that very generally trypanosomes are so scanty in the peripheral blood of unquestionable trypanosoma infections that many slides may have to be searched before a single parasite is encountered. In the case we had at the Seamen's Hospital we often failed to find them. Sometimes in our examinations there would be only one or two parasites in an entire film. Although in this patient the number of parasites in the peripheral blood did not seem very manifestly correlated to the temperature of the patient, yet, judging from what occurred in Forde's case, in Dutton's cases, in Baker's cases, in surra and in nagana, as the parasites are generally most in evidence during the febrile recurrences, it is probably best to make the blood examination when the body temperature is high. I have had no experience of the method for the detection of trypanosomes, but possibly in weak infections the plan I described some years ago for detecting malarial crescents by dehæmoglobinising thick films by dipping them for a short time in water and then fixing with alcohol and staining, or that recently described by Ross for weak malaria infections, might be of service. I do not know if centrifuging the blood with the idea of concentrating the trypanosomes in a particular part of the blood column has been extensively applied to human trypanosomiasis. Dutton appears to have used it to a limited extent, but in Durham's hands[1] it was very successful in nagana infections, and, where possible, should certainly be availed of in the human subject. In the centrifuged blood the trypanosomes accumulate in the leucocyte layer above the red corpuscles.

At best microscopic examination of the blood, generally speaking, is, in a negative sense, unreliable. Some other and more reliable method is urgently required. Naturally we turn to injection of the lower animals with the suspected blood. Unfortunately most of the ordinary laboratory animals are but feebly susceptible, or, if they become infected, the evidences of infection, clinical and microscopical, are long delayed and difficult to recognise. I understand that in Liverpool they have succeeded in infecting monkeys and rats, but this infection apparently is not certain, nor is it quickly manifested; moreover, monkeys are not always available. Professor Hewlett failed in the considerable number of animals he inoculated from our case at the Seamen's Hospital; at all events, in none of these was there that prompt response that we have in rats and mice to the nagana trypanosoma; and to be of much use in what I might designate, considering the circumstances in which a diagnosis is usually sought for in this disease, in field pathology the result should be prompt and unmistakable. Some easily procured animal highly susceptible to human trypanosomiasis is at present a practical desideratum. That there are such animals I have little doubt.

(2) *The Clinical Features of Trypanosomiasis* in (*a*) the European and (*b*) the native.

As regards the latter, the published information is very meagre. In Baker's three cases fever was a feature; but as it was because the patients had fever that their blood was examined, it is quite possible the concurrence of the fever and the parasite was to some extent coincidence, and that the parasite might be present in other natives who have no fever. The experience of Dutton and Todd supports this conjecture.

In the European, however, an irregular undulant fever seems to be a constant feature. Apparently the initial rise of temperature is high. It was so in the case recorded by Daniels and myself; it was so in another Congo case to which I alluded in the *British Medical Journal* some months ago; and it was so in a case in Uganda about which I heard recently from Dr. Moffat. Referring to the latter case, Dr. Moffat, in a letter dated April 5th, 1903, writes as follows: "About a month ago he (the patient) began to have severe fever, which I took to be malarial, though I could find no parasites. . . . I was very soon struck with the obstinacy of the fever, which would not respond to quinine even given hypodermically. On the fifth day of the illness he had a severe attack of what looked like (and probably was) cerebral malaria with maniacal symptoms. I gave him 60 grs. of quinine hypodermically spread over a period of eight hours. Whether as a result I know not, but the temperature fell to normal and remained so for twelve hours. It then began to rise slowly again, and the patient had a more or less continued fever for about a week, and this in spite of repeated quinine administration. The peculiar course of the illness made me suspicious, and I again examined the blood, with the result that I found it full of trypanosomes. . . . Curiously enough, the very next day. . . . his temperature fell to normal, and all the parasites disappeared. After four days of normal temperature he had another attack of fever lasting two days, and the trypanosomes again appeared. He is now again normal and free from fever." In Forde and Dutton's case, and in the Congo cases which I have just referred to, this undulant type of fever was a feature. I fancy tehrefore that, as regards the European at all events, undulant fever is a constant feature of trypanosomiasis.

Another probably very frequent symptom in the Europeen is the peculiar circinate erythema which, together with the accompanying œdema of skin and subcutaneous tissue, has been described by Forde, Dutton, Daniels, and myself. It would appear, however, that these symptoms are not essential, for Moffat writes me that beyond pyrexia his case "had none of the symptoms which were described in Dutton's and your cases."[2] Muscular weakness, rapid irritable pulse,

[1] *British Medical Journal*, 1901, p. 512.

[2] Since this paper was read I have had an opportunity of examining Dr. Moffat's case. A circinate erythema had

anæmia, and breathlessness are probably pretty constant symptoms; but enlargement of the spleen, which was and is so pronounced a feature in Forde's case and in the case Daniels and I have recorded, is absent in another patient heard of on the Congo. In reply to my inquiries this latter patient writes: "As far as I know my spleen has not been enlarged. Certainly I have not been conscious of any trouble with it." Although the erythema in this case was at times very pronounced, it too was absent on one occasion for several months on end, and apparently was not an initial symptom, as it did not show itself for nearly two months from the commencement of the illness.

What may turn out to be a valuable point as an aid in diagnosis is the occurrence of eye symptoms—choroiditis, iritis, cyclitis, and optic neuritis. I have given in the *British Medical Journal* Mr. Treacher Collins's description of the characteristics of the choroiditis in our case, and need not repeat the description. I am indebted to Mr. John Tweedy for the following notes on the condition of the eye in the other Congo case I have alluded to:—

January 18, 1902.—Mrs. M., a Congo missionary for three years and then for nine months; worn glasses for many years, at first only for reading, &c., but lately constantly. Has had several attacks of iritis. In two attacks both eyes affected at the same time; last attack only left eye. Has had several attacks of malaria. Complains of a "glimmer" before the left eye. Complains of a rash (which I did not see, and for which I suggested that Dr. Crocker should be consulted).

On examination:—

V. R. = $\frac{6}{12}$, with her distance glasses sp. + 2·5 = $\frac{6}{24}$.
L. = $\frac{6}{18}$, " " " sp. + 2·25 cy. + 0·5 | $\frac{6}{36}$.
With her reading glasses R. sp. + 4·0 1 Jaeger.
L. sp. + 3·5 cy. + 0·5 | 1 Jaeger.

O.S. Fine dotted ring of urea on both anterior capsules. (Remains of passed iritis. Media otherwise clear. Discs and fundus apparently healthy.)

Ordered ℞ Quinin. sulph. 1 gr.; calomel, $\frac{1}{8}$ gr.; liq. bellad., $\frac{1}{16}$ gr., as pill, three times a day. Ordered fresh glasses.

May 7.—It was thought that the eruption on the face and body was due to quinine. Quinine discontinued. The rash improved; but Mrs. M. got a return of fever, and had to resort to full doses of quinine, and did not notice that rash was worse for the quinine. No further iritis. With distance glasses, R. equals $\frac{6}{6}$, L. not $\frac{6}{60}$, but only perception of light at the extreme nasal upper field of vision. L., for ten days Mrs. M. has seen only out of the inner corner of the left eye. O.S. R., media clear, disc and fundus normal; L., vitreous hazy, especially portions adjacent to the disc; optic disc swollen and blurred, optic neuritis. Ordered mist. hyd. iod. (mild).

After this I saw Mrs. M. at University College Hospital and have no notes of the later stages of the case, and not a very definite recollection of the details.

For a time the optic neuritis was very marked, and was associated with much retino-choroiditis, which, however, I am unable to describe. The inflammation gradually subsided, and to the best of my recollection the sight returned to normal acuteness.

This patient dates her illness from September 29th, 1900. Her first attack of iritis occurred in the middle of May, 1901; a second and more severe attack occurred in the following August, a third in November, and the optic neuritis described by Mr. Tweedy in May, 1902. Vision, she informs me, is now quite restored.

Another interesting point in this case was the occurrence of a transient paralysis. She writes: "About this date (April 11th, 1901) I was paralysed in the left side for about one hour; then after a short interval the right side was attacked, the paralysis lasting for about the same time." It may be remembered that the other case had at one time a peculiar choreic seizure, and also that she had thrombosis of the veins of the leg.

Doubtless as we become more acquainted with the disease, additional clinical phenomena will come to light. An important one may or may not be mononuclear leucocytosis, for if this be a feature of trypanosoma infection, the value of the symptom in the diagnosis of doubtful malaria cases is very much discounted. A mononuclear leucocytosis may be a feature common to several types of protozoal infection. This is a point well worth working out.

(3) *The possible relationship of human trypanosomiasis to a specifically identical infection in some of the lower animals* is a thing that must not be lost sight of. Few parasites are absolutely peculiar to one species of host. We know that the surra, the nagana, the mal de Cederas, and the dourine trypanosomes can each of them be communicated to and live in a considerable variety of mammalian hosts. The same is probably the case with *T. gambiense*. We are a little too apt to assume that the vulgar soil supplied by an ordinary vertebrate is no fit medium for a parasite which has obtained the dignity of being a human parasite. I believe that in the case of the malaria parasite this mistake has been and is made by a good many theorisers. I believe the future will show that both *T. gambiense* and the malaria parasites have other mammalian hosts in addition to the human mammal, and that the humbler mammals have a good deal to do with the endemicity both of trypanosomiasis and of malaria. We require more systematic and more extended observations to clear up this point for both classes of parasites.

A most important question has been opened by Castellani's discovery of a trypanosoma in the cerebrospinal fluid in sleeping sickness. Is its presence there merely coincidence, or is a trypanosoma the cause of sleeping sickness? There are facts and arguments for both views.

The principal facts in favour of regarding the trypanosoma as the cause of sleeping sickness are (1) the frequency of its occurrence in this disease; at all events, in Uganda Castellani found it in 20 out of 34 cases, Bruce in 38 out of 38 cases; and (2) its occurrence in connection with the nervous system. Now, frequency of occurrence may only mean frequency of concurrence; indeed, in the district where Castellani and Bruce worked, *F. perstans* was found more frequently in sleeping sickness cases than was the trypanosoma, and

developed identical in character with that in Forde's and my own cases.

this by Castellani himself and his colleague, Dr. Low. Before concluding on the ground of concurrence in favour of the trypanosoma as the cause of sleeping sickness we must have accurate statistics as to the presence or absence of the parasite in the general population of the endemic area of sleeping sickness, and also as to the geographical ranges of the disease and of the parasite respectively. Such an investigation has disposed of the claims of *F. perstans*, once so hopeful, and may very possibly dispose of those of this newest aspirant to pathogenic distinction.

As regards the significance of the presence of the trypanosoma in the cerebro-spinal fluid, too much importance must not be attached to this, for it is not improbable that it occurs in many of the fluids of the body besides the blood; Durham informs us that in nagana *T. Brucei* is to be found in the vitreous humour.

Against the specific relationship of the trypanosoma to sleeping sickness are the facts that Europeans so far have not been attacked by sleeping sickness, although undoubtedly they must have often been the subject of trypanosomiasis, and that the parasite has not been found in sleeping sickness on the Congo or in West Africa. The former objection may be explained by the assumption, suggested by Castellani, that the trypanosome hitherto found in Europeans is a different species to that found in sleeping sickness. This is surely a very improbable thing, considering that as Europeans get one kind of trypanosoma on the Congo, they might just as well get the other kind that Castellani's hypothesis postulates must occur there also. The second objection I mention is easily and probably correctly explained by the fact that so far the blood in Congo sleeping sickness has not been critically examined for trypanosoma sufficiently often.

To my mind a great, but not insuperable, difficulty to the view that the trypanosome is the cause of sleeping sickness lies in the fact that in some, perhaps in many, instances the interval between the date of infection with the specific cause and the clinical manifestation of the disease is one of several years; the natives of some places give seven years as the limit. Guerin's observations in the West Indies bear this out. A well-authenticated case occurring not very long ago in England is equally conclusive. It is now many years since Guerin's observations were made, and lest from their antiquity they might be considered unreliable, I made it a point of ascertaining the facts of the English case I allude to. The patient was a negro boy sent home from the Congo to be educated at the African Training Institution, Colwyn Bay, North Wales. I recently wrote to the Rev. W. Hughes, the superintendent of the institution, for a restatement of the circumstances, more particularly of dates and symptoms. Under date of July 10th, 1903, he very courteously replied, "The boy you refer to arrived in this country in September, 1885, and enjoyed excellent health for about two years, until, September 1887, but about that time I observed symptoms of the sleeping sickness. At first there was a dulness in his eyes and he was lazy and indifferent at his lessons. He had been able to commit to memory twelve verses a day from the Bible, but, gradually, in a few weeks it was as much as he could do to learn six verses, and a little later on it was useless to try him with these lessons. Then staggering began. He would walk a little way and then rest against a lamp-post or a wall, and we would find him on his knees often in going to bed by his bedside, having gone to sleep while saying his prayers. Once at a later stage, I found him asleep with his hands in a basin of cold water, in which he had been trying to wash his face. Also, towards the final stages, he would refuse to eat and often let the basin drop from his hands, and finally he would not eat at all and would hardly speak."

Although in many specific infections prolonged incubation periods occur, for example, in leprosy, tuberculosis, rabies, &c., so far as we know successful infection with trypanosomiasis is manifested within a few days or weeks from its occurrence. It is difficult to conceive how a pathogenic agent like a trypanosome could remain inactive for periods amounting to years. Still we know so little about the life-history of this class of parasite that we must not make too much of this point.

On the whole I am inclined to the view that the trypanosoma of the African is not the cause of sleeping sickness, and that it bears the same pathogenic relationship to the European that the trypanosome of the African wild game bears to exotic domestic animals; that is to say, that whereas the native man and beast are immune in a pathogenic sense to the native trypanosome, the exotic European and European domestic animals are not so. Such a theory seems to be more in harmony with the epidemiology, symptoms, and pathology of sleeping sickness than that enunciated by Castellani and endorsed by Bruce.

Certain obscure tropical fevers should be studied with an eye to a possible trypanosoma etiology, notably hyperpyrexial fever of West Africa and kala-azar of India and elsewhere.

We know so little about the hyperpyrexial fever of West Africa that beyond conjecturing a possible connexion with the trypanosome I must not venture.

As regards kala-azar and those curious and very fatal forms of chronic fever not amenable to quinine, and accompanied by enlargement of the spleen and liver, and often by hyper-pigmentation of the skin, I think we may have some hope that in the *T. gambiense* or in a similar parasite we may find their explanation. The recently recorded observations by Leishman and Donovan on what may be involution or evolution forms of a trypanosome in splenic pulp in this class of case are most hopeful. It is a pity that so far experimental injection of the blood of such cases into the lower animals has been neglected. I would urge this as a possible means of unravelling the mystery which for so long has shrouded kala-azar and similar types of tropical disease.

(4) As regards the *prognosis* of trypanosomiasis in the African (disregarding sleeping sickness) it is apparently good: as regards the European it is not so favourable, but certainly not necessarily bad. Both of the patients I have had to do with are alive after three and two years respectively—the former expresses herself as being perfectly well; and the latter is certainly no worse, probably better, than when she was first seen nearly a year ago. The trypanosomes are as numerous

as ever in the latter. Apparently immunity as regards their pathogenic properties is being gradually acquired.

(5) *Treatment* so far has proved absolutely unsuccessful. Arsenic, quinine, methylene blue, and horse serum injection, all carried to the limits of prudence, had absolutely no influence for good in our cases.

(6) *The prophylaxis* will be roughly indicated as soon as we know what is the inoculating agent. It may be a *Glossina*, *Tabanus*, a *Stomoxys*, or other blood-sucking diptera; but there are other blood-suckers in Africa besides diptera, more particularly ticks, which should not be overlooked. The carapato disease of the Zambesi basin is certainly produced by the bite of a tick—*Argas moubata*. This is probably more widely distributed than is generally known. Sir Alfred Sharpe, H.M. Commissioner in British Central Africa, told me sometime ago that he thinks he came across this disease near Lake Tanganyika. He very kindly gave me a short account in writing of his observation.

Whether the carapato disease has anything to do with the trypanosome I cannot say, but certainly it belongs to that great group of tropical diseases that depend on infection by insects and their allies. It is well deserving of careful study, not only on its own account, but as possibly tending to throw light on trypanosomiasis and similarly produced pathological conditions. I drag it in here partly by way of suggestion and partly in the hope that by calling attention to it some one with the opportunity may be induced to investigate the subject.

Here I would allude to the debt of gratitude we of the Tropical Section owe to Professor Ray Lankester, Mr. Theobald, and now to Mr. Austen, of the British Museum, for their intelligent appreciation of some of the wants of tropical pathology, and the energy they have shown in trying to meet them. The monograph on the tsetse flies, just issued by the Natural History Department of the British Museum, cannot fail to prove of great value in this study. Mr. Austen's monograph contains practically all that is known about these flies, and it will be, as Mr. Theobald's book on the mosquitoes has shown, a centre for additional knowledge to crystallise around.

In concluding these remarks I must apologise for their loose and discursive character. The subject is so new and so incomplete that they could hardly be otherwise. Such as they are, I hope they may give rise to some useful discussion.

II.—Cuthbert Christy, M.B., C.M.(Edin.).
School of Tropical Medicine, Liverpool.

The Distribution of Sleeping Sickness on the Victoria Nyanza and its Connection with Filariasis and Trypanosomiasis.

Dr. Christy said: On reaching Uganda in July, 1902, as a member of a Commission sent out by the Royal Society to study sleeping sickness, it was my first aim to map out the area of distribution of the disease, and afterwards that of *F. perstans*, in order to see whether the two areas in any way corresponded, as they were supposed to do. The Medical Officer for Busoga district had already remarked its prevalence along the lake regions of his district. The accompanying map will show the distribution of the disease as I found it towards the end of 1902.

The darkest marked portion of the map indicates what I have termed the infective area, or that in which the disease appears to be contracted. This area consists of a narrow strip of coast-line, at its widest not more than ten miles, extending for 250 miles along the shores of the Victoria Nyanza, from the mouth of the Ktonga River, the northern boundary of Budu, on the west, through Uganda, Busoga, and Kavirondo, to Kavirondo Bay. Then across the mouth of the bay, and down the eastern shores of the great lake, where I traced it nearly as far as the Gori River, the provisional boundary between British and German East Africa. A letter, received just before leaving Uganda, from the German medical officer stationed at Shirati, showed that the disease had passed the boundary between the two countries and was gradually spreading southwards. The infective area also includes the margins of all the islands in the British portion of the Victoria Nyanza.

The lighter shaded portions of the map, namely, the centres of the islands, and the district inland beyond the infective area, indicates the country in which the disease is prevalent, but in which it does not seem to be contracted, nor to be infective. I have called this the non-infective area. The cases occurring in it are usually isolated ones, scattered here and there, and whole families are never infected. Moreover, in the majority of these cases a history of the patient having been at or near the lake some months previously can be obtained. The natives themselves in some parts recognise that the disease is contracted in districts which are within sight of the waters of the Victoria Nyanza, and the victims frequently volunteer the information that they have been to the lake.

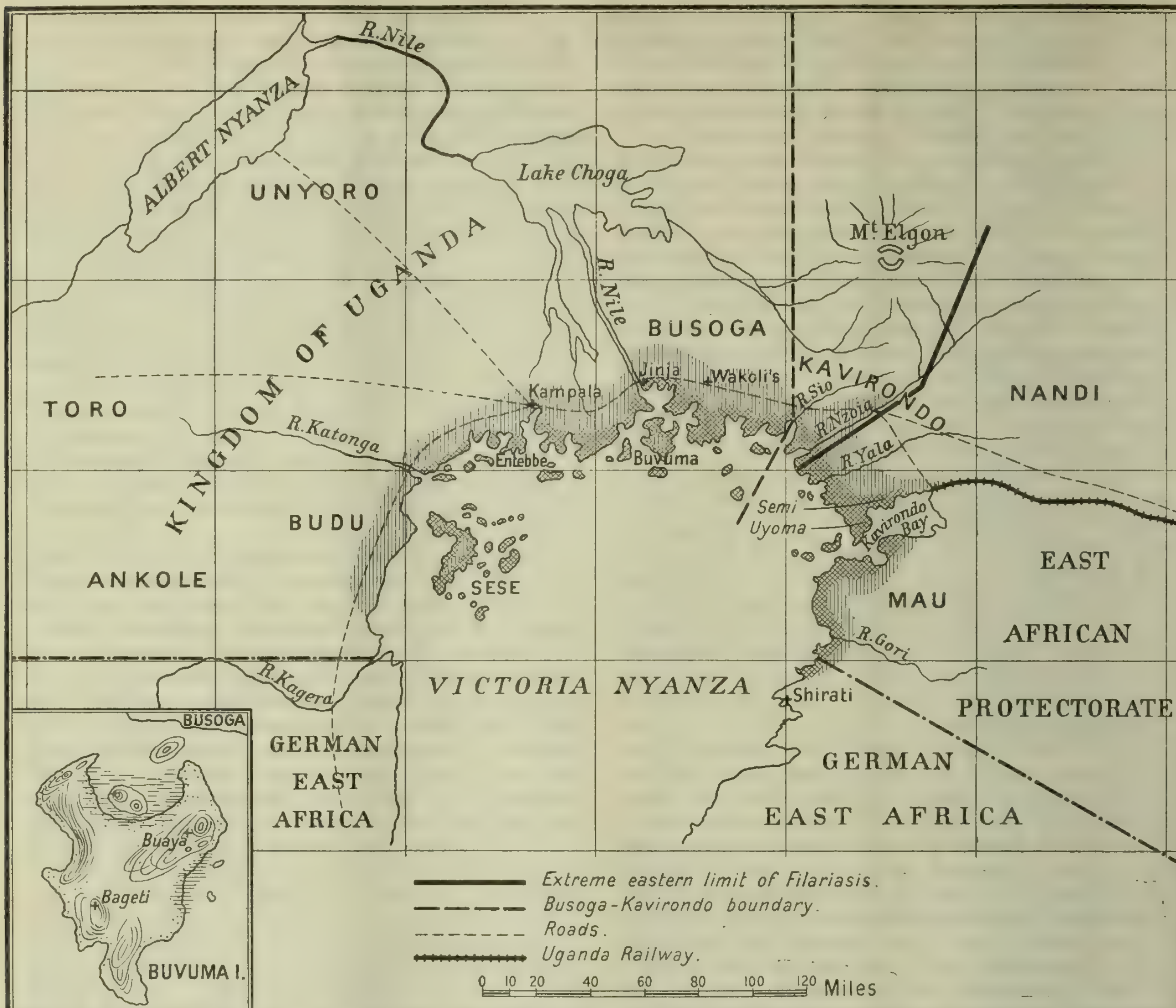
Very few cases of sleeping sickness have occurred to the westward of Kampala and Entebbe, and none south of the Katonga, with the exception of two or three that were reported, and two I saw in Budu, all of which I ascertained had been imported from the Sese Islands opposite, or from Uganda, and of one rather doubtful case in Ankole.

Sleeping sickness is prevalent at Jinja (Ripon Falls), but the infective area shows no tendency to spread for more than a mile or two northwards down the Nile, or along any of its tributaries, nor along any of the caravan routes or roads.

Although I made a very extended search, travelling, during my nine and a half months' stay in the country, over almost the whole of the better known parts of the Uganda Protectorate, as well as over a considerable portion of the western districts of the East African Protectorate, and also into the Congo Free State and German East Africa, I found no other endemic or epidemic areas of the disease.

In mapping out the area of distribution of *F. perstans* I travelled eastwards from Kampala along the coast, obtaining blood slides from the natives on every convenient opportunity, on an average perhaps every ten miles along my route.

All through Uganda and Busoga I found *F. perstans*



common. From 60 to 80 per cent. of both men and women harboured the parasites, until I passed the Busoga-Kavirondo boundary. Once past that boundary the percentage dropped abruptly to 14 per cent., and then to 5 per cent. Still further east, beyond the Nzoia River it was entirely absent, even in districts where sleeping sickness was affecting half the population. I took several hundred blood slides in Southern Kavirondo east of the Nzoia River without finding a single filaria embryo. The same absence of filariasis existed beyond Kavirondo Bay, down the eastern shores of the Victoria Nyanza, and from what I know of the inhabitants, and the open character of the country, it probably, with the exception perhaps of the larger filariæ, does not occur anywhere in the East African Protectorate east of the Nzoia River.

On my journey south of Kavirondo Bay I was fortunate in having the assistance of the medical officer of the Kisumu district. This officer subsequently visited Uyoma Promontory and the badly infected district of Semi, which I had already passed through, and he wrote me afterwards that he had taken and examined many slides, but without finding *F. perstans*, thus confirming my work. He also visited the Nandi plateau, and wrote that he had found no *F. perstans*.

My discovery that sleeping sickness extended along the lake shores for more than 100 miles beyond the extreme eastern limit of filariasis enabled me to report to the Royal Society on October 31st, 1902, that the two diseases are not connected with each other.

I subsequently found that the distribution of *F. perstans* extended over large areas in Busoga, the kingdom of Uganda, Unyoro, Toro, and Budu. I also traced it into the Congo Free State, and found a few cases on the Nile at Wadelai, and again at Gondokoro.

If *F. perstans* were the cause of sleeping sickness, as has been supposed, that disease would have spread far and wide from the shores of the Victoria Nyanza.

There is no evidence to show that sleeping sickness was known in the country before six years ago at the outside, and possibly not before two years ago. There is no doubt, on the other hand, that *F. perstans* is an old inhabitant. It cannot have invaded so large an area as its present distribution in the short space of

THE HONBLE. BOMANJI DINSHAW PETIT,

The donor of One Lac of Rupees to the London School of Tropical Medicine, December, 1901.

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six years, nor can it have infected the inhabitants of some districts to the extent of 90 per cent. in so short a time.

In the island of Buvuma and other places I took a large number of blood slides, both from sleeping sickness cases and from persons apparently free from the disease. The percentage of *F. perstans* in each case was practically equal, being only slightly higher amongst the former—a difference I think not difficult to account for.

In order to study more exactly, amongst other points, the characteristics of localities in which were situated a large number of cases of sleeping sickness in a circumscribed area, I made a visit of some days' duration to the badly infected island of Buvuma. The accompanying small map of that island, in which the small dots show the actual location of sleeping-sickness cases, illustrates one result of my investigation. I was conducted from shamba (plantation) to shamba all over the island, and found that the majority of the outlying huts which were not empty contained a case or cases of sleeping sickness. I discovered that practically all the cases occurred near to the water's edge, on the lowest lying parts of the island, and that the huts were invariably surrounded by bananas or forest growth. On the other hand, the village of Buaya, situated on high open ground, and protected by a high wattle fence, did not contain a single case, and only two deaths had occurred amongst those in the chief's village at Bagete, situated fairly high, but near to forest growth.

These characteristics hold good for all the sleeping sickness area. Compact villages and populous centres are not nearly so seriously affected as the shambas and outlying places. Scattered villages, where the houses are surrounded by bananas, &c., are less exempt, with the exception of large places like Kampala, which come under the heading of populous centres, and are not infected.

In strong contrast to Busoga, with its dense forests and cool banana groves, the prevailing landscape in Kavirondo consists of rolling downs covered with short grass. There the parts affected by sleeping sickness, as elsewhere, are the districts bordering on the Victoria Nyanza and along the estuaries of the rivers, where grows scattered trees and scrub, and fantastic candelabra euphorbias. The exemption of villages is less noticeable in Kavirondo, where they are all more or less compact, and each family has a separate village, usually surrounded by a high wattle fence or an enormous floral hedge. Here, again, however, large villages situated on high ground and in the open, although within the infective area, are almost exempt.

On reading the above description of the characteristics of the localities most affected by sleeping sickness, it will be evident to those who are conversant with the habits of the genus *Glossina* (tsetse fly) that the disease occurs in just such places as might be inhabited by the tsetse, namely, low-lying situations near to water and amongst trees or scrub. The tsetse (species ?) we know is found occasionally in open thorn forests, far from water, but this is exceptional. Colonel Bruce, now studying the subject of trypanosomiasis and sleeping sickness in Uganda, has already found *Glossina palpalis* to be fairly common in certain parts along the lake shore, but it remains to be seen whether the area of distribution of this fly agrees with that of sleeping sickness as mapped out by myself and described in his paper.

If *Glossina palpalis*, whose bite and peculiar local distribution I am well acquainted with at certain places on the Niger, is ultimately found to be common all through the sleeping sickness area, it probably is troublesome to men only at certain seasons, for, although without looking for it, I met with the fly on two or three isolated occasions, nowhere was it a pest, certainly nowhere within the sleeping sickness area. In Buvuma Island it did not attract my notice at all.

The genus *Tabanidæ*, to which "hippo" and "mangrove" flies belong, has a wide distribution, which extends all over the country and along the Nile, and in no way agrees with that of sleeping sickness. The bite of these flies is, however, severe, and they may be regarded as possible carriers of disease.

On reading a recent work on the tsetse fly (seven species of *Glossina*) by Mr. E. E. Austen, of the British Museum, I learnt for the first time that several travellers have recorded the fact that the "tsetse" avoids the neighbourhood of villages, the probable reason being its known dislike to the smell of fæces, one writer asserting that, where the fly is most numerous and troublesome, it is only necessary, upon shooting some animal, to turn out the contents of the stomach, and all the flies at once leave the vicinity. As I have shown that sleeping sickness avoids villages and populous centres, the above fact is a remarkable coincidence, and, if correct, the inference is unavoidable that some species of tsetse is the carrier of the causative agent, probably *Trypanosoma Castellani*, of sleeping sickness.

Although not connected with the subject of distribution, it may be of interest to note that a very frequent, though not invariable, symptom of sleeping sickness is an inordinate appetite, and this very symptom I noticed in Nigeria in 1898 was conspicuous, and almost invariable, in horses suffering from trypanosomiasis.

There are, however, many facts which cannot at present be reconciled with the trypanosomiasis theory of the causation of sleeping sickness.

III.—J. Everett Dutton, M.B., Ch.B.(Vict.), and J. H. Todd, B.A., M.D., C.M.(McGill).
Liverpool School of Tropical Medicine.

Researches on Trypanosomiasis in West Africa.[1]

Drs. Dutton and Todd wrote: We returned only three weeks ago from the Gambia, where, as you know, we have been working on trypanosomiasis. We are leaving again for that continent on September 3rd, this time for the Congo Free State, to make further investigations and complete our work on trypanosomiasis, so that it is unfortunately not possible for either of us to spare the time necessary to attend the session. We shall read with a great deal of interest the reports of the discussion, particularly those portions

[1] This communication was addressed in the form of a letter to Sir Patrick Manson.

which concern themselves with the possible causal relationship of trypanosomata and sleeping sickness, and with methods of finding the parasites in infected animals when they are present in the peripheral blood in only small numbers. In writing this letter we are afraid that we have taken it for granted that you hav seen our preliminary report published last winter in the *British Medical Journal*, since much that follows is a continuation of that communication.

Prevalence and Distribution in the Gambia.

We find that the disease extends practically from the mouth of the river to the end of British territory, some 250 miles up stream. We have no evidence to indicate that there is any one type of locality particularly subject to the disease; neither do we find that there are zones or belts of territory in which the malady occurs. For instance, although we found three cases out of thirty-five people examined in one village situated among the mangrove swamps, still we have examined many other similarly situated villages in a far more thorough way without seeing a single parasite. We have found cases in low-lying riverside villages, in towns placed on high ground, on the sea-coast far from mangrove swamp or river (Kommbo District), and in the upper river at Fatotenda. The latter town is situated on the river bank, here 20 feet in height, and is far from any mangrove swamp. The neighbouring country is very flat, and extends in a sparsely wooded plain, broken only by a fresh-water marsh or two on all sides for a great distance. How far the disease extends into the interior we are unable to say, since British territory stops on either side at only seven miles distance from the river, and we have only once had the opportunity of making investigations in French territory—at Maka, about thirty miles from the river bank. Here we examined about 100 natives with negative results.

Prevalence.—We have now seen six cases of trypanosomiasis in the native, and have once found the parasite in a white man (quadroon). Over 1,000 persons in Gambia have had their blood examined by us. The percentage which these figures give can by no means be taken as exact, both because the number examined is too small, and because those who were examined were only those individuals who could be persuaded by small bribes of beads, candy, &c., to be pricked. Remembering these facts, and taking into consideration the method of examination we employ (described in preliminary report in *British Medical Journal*), we think that we are justified in assuming the disease to be much more common among the natives than the figures seem to indicate.

Observations on the Disease.—The quadroon case is the case mentioned in the preliminary report already spoken of. There we gave a synopsis of its characteristics. On January 18th we went down river from McCarthy Island to see Mr. Q. at his factory, Sakuta, and to stay with him for a day or two while examining him and seeing the natives in the neighbouring villages. We found him in excellent spirits, and he said that he was feeling "very fit." He had been free from shortness of breath and palpitation for some time, and since May, 1902, had gained 21 lbs. We found his temperature normal, pulse 104, respirations 18, blood examination showed red cells 4,350,000, white cells 8,000, hæmoglobin 96 per cent., and in 0·5 ccm. of blood 19 organisms were seen (centrifuged). The colonial surgeon, Dr. Chichester, had advised him to take a preparation of arsenic, but none had been taken, and Q. had dosed himself with four sets of capsules from Dr. Kidd Davies, an American patent medicine man—one of the capsules contained methylene blue—and Warner's safe cure and quininæ bisulph. 9 gr. every other day. Since then we heard nothing of him until March 22nd, when we got a message to say that he was very ill, and "would we come to see him?" We started as soon as possible, but unfortunately arrived too late to see him alive. His friends said that his last illness had commenced with a cold and fever on the Monday; he soon took to bed, complaining of headache and pain over the spleen. On Friday he was unconscious, and on Sunday dead. No more exact information than this could be obtained from the friends, and a necropsy was refused us. The original disease in this case commenced October, 1901, so that its duration was almost the same as in Mr. K's case, namely, a year and a half.

Native Cases.—As stated above, we have found parasites in the blood of six natives—two females, four males. The results of our examinations are as follows: Woman, aged 35, at Lamin; boy, aged 9, at Lamin; girl, aged 16, at Lamin; boy, aged 12, at Gunjur; man, aged 35, at Kountawuru; man, aged 22, at Fatotenda.

Taken as a whole, the history and clinical examination of these cases revealed nothing important. In the younger cases the usual enlargement of the spleen was met with. Enlargement of lymphatic glands was present in some, not in others; parasites were very scanty in all except the girl aged 16, where twenty-three were counted in one cover-slip. We will describe the detail of these cases in our report. While considering the above native cases, we should like to point out, first, that it is difficult to get reliable information from a native—they say whatever they imagine will please their questioners; secondly, we have only had the opportunity of examining the cases at most twice; this is, of course, due to the exigencies of travelling, &c.; and, thirdly, we have reliable histories from two cases only.

Taking all the above facts into consideration, we believe that the disease as it occurs in natives is a peculiarly mild one. Clinically we believe it impossible to diagnose the disease in the native. The accelerated pulse-rate, slight rise in temperature, history of fever, &c., occur in natives in which no parasites have been found. We have long thought, because of this lack of symptoms, that possibly the black man in this disease bears the same relation to the white as does the game of Central Africa to domestic animals in the tsetse fly disease. The parasites found in the quadroon and native cases seem to be identical in morphology and reaction in animal experiments. We have had no opportunity of investigating the course of the disease in the native—if we can call it a disease—but the ages of the native infected indicate that there can be no acquired immunity. It would be rather curious if the woman

at Lamin or the man at Kountawuru had only recently become infected for the first time after having been exposed to infection from childhood. We think that the varying ages of the various cases is another point in favour of our belief that the parasite occurs very frequently in the natives, but occurs only in a periodic manner in their peripheral circulation.

The Disease in Horses.

The horse is the only animal in Gambia in which we have found pathogenic trypanosomes. We have examined cows, dogs (few), goats, sheep, monkeys, and a few deer, as well as many small fry such as rats, squirrels, &c., but without result. We have unfortunately been able to examine very few donkeys and have been unable to get one for inoculation purposes. Out of thirty-six horses examined ten were infected.

Sketch of Symptoms.—The first thing noticed is that the horse seems to have lost something of his accustomed "buck and vigour." He no longer seems to have the same vivacity in harness or to have as much endurance as usual. Still the animal is apparently in perfect condition. He is fat and his coat is in good condition. Outwardly he is in perfect health. The temperature is only slightly above normal at this time (102·6°), and if the blood is examined but few parasites will be seen—perhaps as many as ten to a cover, often not so many. Two or three weeks later more marked signs of ill-health become manifest. The horse has commenced to grow thinner, his head is drooping, his eye is not so bright, and although he is well able to go under saddle, still the rider is conscious of the animal's weakness, which has now become patent. At this period there are periodical rises of temperature, when the parasites will usually be found in the blood, although at other moments they may often be absent. In another month emaciation is more marked. The ribs commence to show, as a Frontier Police Officer pithily expressed it. "The flesh seems to slip back from the horse's chest to his belly." The scrotum becomes relaxed and the testicles hang so low that they seem to be œdematous at first sight. At times a slight watery discharge from the eyes may be observed. In none of the horses have we observed the marked œdema of abdomen, scrotum and legs, nor the staring of the coat which is described in the "tsetse fly" horses in South Africa. This last stage has lasted in one of our horses for seven months, and during this time on only four occasions have parasites been seen in his blood. On each occasion their presence was accompanied by a slight rise in temperature, 103° or thereabouts. We brought this horse home with us. It is now in Liverpool, and its condition has much improved since leaving Africa. As the disease proceeds emaciation becomes more and more marked. The ribs and ilia stand out prominently. The animal wears an apathetic, chronically tired expression, which is most characteristic. No œdema is to be made out. The [illegible] discharges from the eyes—in small quantities—is often seen. Saddle galls and sores on the projecting hip bones are often present. No hæmorrhage has been observed in any of the mucous membranes. No blood has been seen in the urine. The parasites are now almost continuously present in the blood and may reach very considerable numbers. The temperature fluctuates, though it is generally raised, and may go up as high as 105°. Two horses have died under observation. One lingered for three days, scarcely able to rise from the ground, in a state of utter weakness. His breathing was very laboured, he sweated almost continuously, and just before death had a slight convulsive seizure. The second animal died suddenly one day after being taken out a little distance to graze. In this animal a few conjunctival petechial hæmorrhages were seen. The most notable features observed in the necropsies of these two animals were the yellow gelatinous œdema fluid found around the sheath, and in the first case on the abdomen, the amber-coloured lymph with flakes of yellow gelatinous lymph seen in the peritoneum and in the pericardial and pleural cavities. There was a general enlargement of all lymphatic glands. Some were soft, amber-coloured and watery, others had a chocolate-coloured centre, and still others showed marked petechial hæmorrhages. The spleen was not enlarged. The lungs were congested. The liver showed fatty change. In one case the heart showed marked fatty degeneration (thrush heart). To the naked eye there was no change in bone marrow. Only in the very last stages of the disease does any marked alteration in the blood seem to take place, then both red cells and hæmoglobin are diminished. Just before leaving Bathurst we heard that a year-old colt, examined and found to be infected in October, 1902, was still alive. On the other hand, a similar horse in much the same condition died two months after we bought it. We think from what we have seen that it is not impossible that horses may occasionally recover.

(To be continued.)

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ekiri.

UEBER DIE ÆTIOLOGIE VON "EKIRI" EINER EIGENTHÜMLICHEN, SEHR AKUTEN, RUHRÄHNLICHEN EPIDEMISCHEN KINDERKRANKHEIT IN JAPAN (The Etiology of "Ekiri," a Peculiar Acute Epidemic Disease of Children in Japan, resembling Dysentery), by Sekehito Ito. *Centr. für Bakt., Paras., u. Infektionsk.*, 1903, vol. xxxiv., No. 6.—The author describes the course of the disease as very rapid, the children attacked usually succumbing within twenty-four hours. The onset is very sudden; the symptoms being high fever, mucus stools, convulsions, followed by coma. Death takes place in consequence of paralysis of the heart. The investigator has found a bacillus which he considers to be the agent of the disease. He describes its characters, and has given it the name of "Ekiri bacillus."

Plague.

THE SEAT OF ENTRANCE OF PLAGUE INFECTION.—Schottelius is of opinion that plague appertains to that

category of diseases the infection of which is introduced through the respiratory organs. This is particularly the case in pneumonic plague. The author directs attention to the dangers of the expectorations of the patients with this disease, as the sputum contains enormous numbers of *Bacilli pestis* which may thus be scattered broadcast. Dr. Schottelius considers that the white race is exposed to less danger than the coloured races on account of their superior conditions of nutrition and hygiene; whites are, therefore, comparatively immune. He, however, fears the possibility that the bacillus of plague may gradually adapt itself to the organism of the white man.

Uncinariasis.

The Treatment of Uncinariasis, by Thomas A. Claytor. *Journ. of the Amer. Med. Assoc.*, August 1st, 1903.—As the ova are always found in the fæces, and cannot exist without air, Claytor suggests as a primary means of combating the infection that *trench latrines* should be used outside the villages. Thymol is specific in its action, but being a poison must be carefully administered and its effect watched. He considers 30 to 60 grains of thymol a safe dose for human beings; one or two tablespoonsful of brandy should be given subsequently, and a purge should follow later. Or it may be given in two doses of 30 grains each at 8 a.m. and 10 a.m., and a dose of magnesia given two hours after the second dose. The stools must be microscopically examined for eggs every week, and treatment persisted in as long as they can be demonstrated.

Yellow Fever.

Contribution to the Bacteriology of Yellow Fever, by Ivo Bandi. *Centralbl. f. Bacter. Orig.*, 1903, vol. iv., No. 5.—Bandi has come to the conclusion, from researches in yellow fever, that Sanarelli's *Bacillus icteroides* is the specific cause of the disease. Bandi asserts that this bacillus is always present in cases of yellow fever and can never be demonstrated in other diseases. He attempts to disprove the discoveries of Reed and Carroll by stating that these investigators may have been mistaken cases of febris biliosa gravis and icterus gravis for yellow fever. The paper, though it does credit to the author's industry, cannot be said to be either practical or scientific.

Erratum.—In the leader of this Journal of October 15th, 1903, p. 318: For "Member of the Legislative Council at home" read "Member of the Legislative Council in India."

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
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3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

The Journal of Tropical Medicine.

CONTENTS.—NOVEMBER 16TH, 1903.

Original Communications.

CALABAR SWELLINGS ON THE UPPER CONGO.

By Sir PATRICK MANSON, K.C.M.G., F.R.S., LL.D.

H. S. S. left England for Central Africa in June, 1899, and in September of the same year reached his station, Yakusu, near Stanley Falls, Upper Congo River. About a year later he was affected for the first time with the peculiar localised œdema which from time to time has since continued to recur. He was informed by other missionaries that he would suffer from these swellings, as all missionaries—ladies excepted—previously residing at that station for periods of more than six months had become similarly affected.

On the occasion of his first attack Mr. S., after a rather restless night, was awakened in the early hours of the morning by a feeling of pain, deep-seated and dull, in the extensor aspect of the left forearm. In the morning he noticed a swelling, somewhat indurated and œdematous, extending along the course of the muscles to the wrist. The pain soon subsided, the swelling rather more slowly. There was distinct loss of power in the part affected, which was restored, however, within twenty-four or thirty-six hours, with the subsidence of the swelling.

This attack occurred in June, 1900, and has been followed by six or seven similar attacks, always affecting the left forearm, and with exactly the same symptoms. Mr. S. has noticed that a low state of health seems to have a predisposing influence, three of the attacks having come on after malarial fever.

Mr. S. returned to England in May, 1902, and suffered from a slight attack of hæmoglobinuric fever in June of the same year. During convalescence the swelling once again appeared; again in December, 1902, after the usual familiar premonitory symptoms, the extensor aspect of the left wrist and hand, extending to the knuckles, became swollen and œdematous. The swelling had never previously involved the hand, being confined hitherto to the forearm. No further swelling has appeared to date (September, 1903).

Shortly before Mr. S.'s visit I saw another missionary from the same station on the Congo who, when I saw him, had just had one of these swellings; indeed, some œdema could still be made out in the wrist and hand. I searched the blood of both of those gentlemen for filariæ, but in neither did I succeed in finding parasites.

The station of Yakusu was founded by the Baptist Missionary Society in the year 1895. During the last five years on an average three missionaries have been in residence. The settlement is situated on the north bank of the Congo, near the confluence of the Lindi tributary and the main river, and some twelve miles below Stanley Falls. The subsoil is a gravelly one, and the frequent rains quickly drain off the station premises to a small stream rising in the forest and joining the river 200 yards above the station. Since 1897, when more extensive clearing of the forest was made, the health of the resident missionaries has been up to the average health enjoyed by the missionary staff on the Congo River.

It has been noticed, however, that there is one ailment peculiar to the district, and apparently to the immediate locality of the station, viz., the swellings above described. Every male white who has resided there more than a few months has been attacked. One missionary, who has spent more than twelve years in Africa, and who first went to Yakusu in 1897, being then in his fourth year of continuous service, suffered, I am informed, acutely during the next eighteen to twenty months. At different times all his limbs were affected, as well as the oral region on both sides. After a furlough of two years in England, where he continued to suffer from these swellings, though in decreasing severity, he returned to Stanley Falls in the autumn of 1901, and has suffered slightly since from the same symptoms. They have never since

returned with the same severity as formerly. Four other missionaries, not including Mr. S. S., two of whom are at present at Yakusu, have been similarly, though less severely, attacked. A lady who has now resided more than three years at Yakusu has recently, in the spring of this year, been attacked, though only slightly, and is, I believe, the first case of a lady missionary who has become subject to the swellings.

Mr. S. S. informs me that *Filaria loa* is common amongst the natives: he has seen some half dozen cases. *Filaria nocturna* has also been found.

The peculiar lesion referred to in the foregoing notes, for the substance of which I am indebted to the Rev. H. S. Smith, is evidently identical with those transient localised œdemas which have come to be known as Calabar swellings. Their peculiar geographical range, which, it would seem, includes the Congo basin, the fact that they come and go, the fact that they persist in recurring after the subject has left the endemic districts, render it practically certain that they are of parasitic origin. As they have been found in association with *Filaria loa*, and appear to be specially prevalent in the geographical area of *Filaria loa*, the conjecture that they are caused by this nematode seems to be not unreasonable.

It has been supposed that *Filaria loa* is the parental form of *Filaria diurna*, and, as a matter of fact, *Filaria diurna* has been found at least twice in patients who harboured, or have harboured, *Filaria loa*. It would be reasonable, then, to expect to find *Filaria diurna* in cases of Calabar swellings. Unfortunately for this conjecture, in the examinations of the blood of the five or six individuals who have been the subject of these swellings, I have failed to find *Filaria diurna*, or any other nematode. This failure may have been due to the examinations having taken place at times when the parasite was temporarily absent from the blood. It may be that *Filaria loa* discharges her young not continuously but intermittently, in which case, if the infection be a mild one (*i.e.*, if there be few parental loas), a single examination might very well miss the embryos.

It has occurred to me that these singular swellings may be provoked by the discharge into the connective tissue of her embryos by a parental loa. The loa is a connective tissue parasite, and therefore her embryos must in the first instance be discharged into the connective tissue, where they may act as a mild irritant and produce a transient œdema. From the connective tissue they must find their way along the lymphatics into the general circulation, where their life may be a limited one as regards time. Should, then, an examination of the blood be made soon after the appearance of a Calabar swelling the embryo might be discovered. This, I confess, is pure conjecture. But I think the hypothesis is one worth testing, and if anyone who has the opportunity will send me specimens of day and night blood (thick films) from the subjects of calabar swellings, actual or recent, and procured day by day, say up to a month from the date of disappearance of the œdema, I will be pleased to have them examined and to report the result.

GOUNDOU: ITS RELATION TO YAWS.

By Dr. A. Nell.

Bibianaha.

(With Illustrations.)

I had seen several cases at Cape Coast Castle, at Sekondi, and in villages along the route up-country, but Amongkwa (the subject of these photographs) was the only case I was able to examine minutely and repeatedly. Inquiries I made in several quarters led me to conclude that goundou always presents symmetrical enlargements, that goundou is fairly common in the Gold Coast Colony, and especially among the Fantis, although not limited to them. It has not been noticed as a tribal peculiarity within recent years and native traditions do not (to my knowledge, which is limited), include any one tribe with bossy noses. It is possible that a tribe with bossy noses once existed, but without a place in native history, and that intermarriages spread the peculiarity. I must here point out that the condition is not acquired, but congenital. Among the Gold Coast Fantis all cases are referred to birth or early infancy; adults are not known to develop goundou, except from enlargement of pre-existing small prominences. A number of adults, male and female, have small prominences or ridges on the same nasal sites. The congenital cases undergo an attack of severe osteoid pains, excessive nasal secretion with frequent bloody discharges, and frontal pain and feeling of weight in the frontal region, each attack preceding or accompanying an enlargement of the nasal bosses. The subsequent growth in size of these nasal bosses increases *pari passu* with general growth to adult life, after which the nasal bosses share the tendency of the normal structures of the body to cease increasing in size.

The nasal enlargements which appear first in early infancy also follow such an attack. I infer that congenital markings escaped notice until the acute enlargement made nasal bosses evident. In adults, great enlargement after similar attacks is all the information to be got; such cases were admittedly acute enlargement of congenital markings, which did not unduly attract attention to the face. I was informed that enlargements in adult life never attained the size of enlargements in infancy. The period of "acute enlargement" was generally given as "at about two years of age, when children begin to run about more freely, or at about 12 years, when growth to puberty was most vigorous." Confusing answers and vague statements make the evidence about the periods of acute enlargement unsatisfactory. One clearly demonstrated fact was the association with yaws—yaws in the parents, coincident yaws in brother or sister, yaws in the individual before or after the nasal attack—and an inability of the native to give any points of difference between an attack of yaws and the attack with acute enlargement of the nasal bosses.

I cannot venture to determine whether yaws is the primary cause of "goundou" or merely causal of the acute enlargement. In using the expression "acute enlargement" I desire to make clear the drift of the information I could get; that the nasal bosses only

grew in size in proportion to the growth of the body, except for the one definite increase following a localised attack, resembling yaws in its symptoms. Amongkwa's family history of yaws was very clear; he occasionally had slight attacks of arthritic pains and rupial eruptions, which were treated with mercurial ointment.

The growths interfered slightly with vision, in walking down-hill, or lifting pails of water on to a shoulder yoke, and in similar actions; of course there was no difficulty when Amongkwa became a miner, and he proved a quick worker with the wheelbarrow. There was slight narrowing of the middle meatus of the nose, no hypertrophy of septum, or of turbinates, and no anomaly of mucosa. The lachrymal duct was patent, and the outlet not unduly small. The hard palatal structures seemed normal, and the absence of pharyngeal dryness indicated an absence of difficulty in nasal respiration. An habitual loudness, exceeding the noisiness of the Fanti, and an excitability even more than Fanti-normal, drew general attention to Amongkwa's presence in the camp; but I could not find any nasal interference or associated attacks of headache in connection with this loudness, and his slight deafness may account for it. The bony bosses were covered by healthy skin, freely movable over them, and seemed quite unconnected with other bones than the nasal processes of the superior maxilla; the structure was of hard, compact bone on the surface. The patient would not permit removal except for a heavy pecuniary remuneration.

I hope some reader will exercise any opportunity he may get of dissecting a case of goundou, or securing a specimen for the museum. In the absence of more extended opportunity for personal observations, my conclusions, summarised below, need to be corrected and supplemented by your readers:—

Conclusions.—(*a*) Yaws bears a causal relation to goundou; (*b*) "goundou" are symmetrical osteomata on the nasal processes of the superior maxillary bones; (*c*) "goundou" are always congenital, either apparent at birth or to be detected on close examination as faint bosses or ridges; (*d*) general enlargement in size is always concomitant with body growth, and stops with full adult life; (*e*) an "acute enlargement" follows or manifests an attack of yaws; hence some congenital cases are not noticeable if no acute enlargement had occurred, and adults with slight ridges or bosses should be questioned regarding "goundou" or yaws in the family.

THE EFFECT OF DRAINAGE AND OTHER MEASURES ON THE MALARIA OF KLANG, FEDERATED MALAY STATES.

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[The Illustrations will be inserted in our next issue.—Ed. J.T.M.]

Of all diseases which afflict man none, perhaps, is of more importance than malaria. Its distribution is widespread. The Americas, Europe, Asia, Africa and Australia are all more or less under its baneful sway. Thousands upon thousands of deaths are due to it each year. As Sir W. MacGregor recently put it, half a million people more than the population of Scotland, die annually from malaria in India alone, and the nearer the Equator the greater the amount and the greater the virulence of the disease. As a general rule, malaria is the great barrier which shuts the white man out of the Tropics. It must be overcome before colonisation can be anything worth the name and before vast tracts of the richest land in the world can be utilised. Of vital importance, then, was the proper understanding of this disease, and among the men who have done the best work are Laveran and Golgi. They discovered and worked out the life-history of the parasite in man, but how it come to infect man and wherein it was to be found outside of man, was still a problem. The old idea of a miasma, arising in the evenings from swamps and low-lying places, was very near to the truth, and I love to think how near the old physicians were to winning one of the most cunningly hid of Nature's secrets. But after all, it was only a theory. Observations were recorded apparently disproving it. Swamps were expensive things to drain, and more expensive to fill in, and it can hardly be a matter for wonder if energetic measures were not generally taken against the disease.

The patience and genius of Ross, working on Manson's theory, was, however, to win the secret, and open a new era in the history of the tropical world. At last men knew definitely how the danger was conveyed, and how it could be combated, and Ross himself has been foremost in showing how the knowledge gained might be most profitably utilised.

On the lines laid down by Ross, sanitary works have been carried out in Selangor, and the results have been so striking that it seems only right they should be published as an encouragement to others to press on the campaign.

Selangor, one of the States of the Malay Federation under the protection of Britain, lies on the western side of the mountain range which forms the backbone of the peninsula. The third degree of north latitude runs through the middle of the State.

For a distance varying from 1 up to 20 miles inland from the sea the country is flat and, where undrained, swampy. Between this flat land and the main range it is hilly. The whole coastline, with the exception of a few stretches where broken shells form a white beach, is fringed by mangroves growing in soft mud, and up all the streams and rivers the mangroves extend as far as they are under the influence of the sea water.

A low-lying coast with swampy land behind is naturally a favourable place for malaria, and during the past few years the coast districts of Selangor have suffered severely. On taking up duty as Surgeon of the districts of Klang, K. Selangor and K. Langat, I found my main work to be with malaria. Large parts of these districts are unexplored swamps and forest, but on each river there is a town and along the coast numerous small villages. A good road connects the main towns.

At Jugra, the main town in Kuala Langat, malaria had been so bad that it had almost been decided to stop quarrying granite near to the town. As this was the only supply within the district, stopping the quarries

would have meant a large increase in expenditure in transporting metal, if road-making was to be continued. Owing to malaria, Government officers were continually ill and coolies were dying off at such a rate that the district had a very bad name and labour was very scarce. Indeed, malaria was so rife that in 1901, of all cases treated at the hospital, 55·8 per cent. were malarial, and a proposal for moving the town was even considered by the Government. At the same time there had been an outbreak of malaria in the hospital for beriberi patients at Jeram in the district of K. Selangor. The hospital was opened on October 11th, 1900, and before the end of the year no fewer than 23 out of 61 beriberi patients had contracted malaria. The place was called a "fever-ridden spot," and was shunned by every one. Indeed, the whole district of K. Selangor had suffered so severely from malaria that in 1899, as found afterwards, the percentage of malaria for K. Selangor district was 59.

In the district of Klang the chief town is of the same name. This remained the railway terminus until September 15th, 1901. To save several miles of difficult river navigation, new and larger wharfs were built at the mouth of the river and the railway extended there. The new port, to be called Port Swettenham, had been very malarious, and there had been much sickness among the coolies working at the wharfs.

In Klang hospital I found many cases of malaria, and cases of malarial coma were not uncommon. It will therefore be seen that malaria was certainly the most important work. The prevailing idea was that a huge malarial wave was sweeping the district. Regarding malaria as a strictly local disease, it seemed to me that each district must be studied separately with special regard to its local conditions, and these in each district were different. At Jugra the town lay at the foot of a hill 915 feet high and was closely shut in between the hill and a mangrove swamp. In Kuala Selangor the malaria was spread out over a large flat agricultural district stretching on along the coast. Klang town was built on some small hills and the flat land about these, while Port Swettenham was a mangrove swamp, for the most part covered by all high tides. As a result of enquiry I found that the idea of a wave passing regularly along the coast was not the explanation, but that each of the outbreaks was definitely related to its local conditions. A study of the malaria of each district has revealed many interesting points with regard to the effect of public works, introduction of susceptible individuals, &c., but at present I must confine myself to Klang and Port Swettenham.

The district of Klang is some twenty miles long and the same broad. For the most part it consists of undulating land, the hills reaching from 100 to 500 feet high. Along the coast, however, there is a band of rich flat land some five miles broad. Klang is the most important agricultural district of the State, and there are large rubber and coffee estates. The population of the district at the census was 18,110.

The town of Klang is situated on the river of that name. The population within the town limits at the census in 1901 was 3,576. Finding malaria so prevalent, the necessity of obtaining accurate statistics was very evident, if Government was to be persuaded to grant the money necessary for sanitary improvements. The only ones available were the numbers of patients admitted to hospital. All deaths were registered, but the cause of death was not certified by a qualified practitioner for obvious reasons. More, however, was required. It was necessary to find out from where the cases were coming. Unfortunately no help could be got from the hospital register, as the register in use at the time showed only the district from which the patient came and not his exact residence. This was altered and the exact residence of all cases was entered. To this I paid special attention. To widen the basis of the statistics, a new return was made of the number of cases treated at the out-door department. The disease of officers obtaining sick leave was recorded; and finally, for a number of months, I personally kept a register of the houses from which malarial cases came, with the number of cases in each house.

On inspecting the town, the breeding places of Anopheles mosquitoes were everywhere to be found. Probably the most important swamp was one in the very centre of the town and surrounded on two sides by rows of houses. Here in innumerable wells, used and disused, larvæ in abundance were found. As will be seen from the plan, a somewhat semicircular range of small hills surrounds the town, and along the foot of these the ground water was naturally high, in many places forming permanent swamps, even during the driest weather. Where it was not permanently swampy, but the ground water was still high, the ground was literally riddled with wells, many in disuse. Indeed, throughout the whole town Anopheles were found breeding in enormous numbers in swamps, wells, and road drains.

It was obvious that while some filling in would be necessary, the great necessity was a good drain by which most of the swamps at the foot of the hills might be drained.

Accordingly, having obtained some definite facts about the malaria, these were laid before the Sanitary Board, and along with them a proposal for a large brick drain, which the district engineer estimated would cost $10,000. This proposal was strongly supported by the chairman, Mr. H. B. Ellerton, who took a keen interest in the sanitary condition of the town.

In a special report, in July, 1901, to the State Surgeon, asking for his support for the Sanitary Board's proposal, I pointed out that—

(1) While the total number of cases treated at the hospital for the first half of 1901 showed an increase of only 3·25 per cent. over the corresponding period of 1900, the increase in the number of malarial cases had amounted to no less than 69·27 per cent.

(2) On analysis of the places from which the cases for the previous three and a half months had come, 55 per cent. came from Klang.

(3) To my personal knowledge 60 houses out of the 293 within the town boundary had been infected with malaria within the previous three months.

(4) That the estates, which were much better drained than the town, only sent in 11 per cent. of the cases.

(5) The prevailing type of parasite was the malignant or tropical form.

(6) Since, in the returns since 1896, "malaria is seen to be more prevalent in the latter half of the year, the marked increase of fever in 1901 is a matter for serious consideration, and some action in the way of draining is clearly indicated." This report was accompanied by a plan of the town showing the distribution of the infected houses and the swamps lying within the town boundary.

The proposal of the Sanitary Board was supported by the State Surgeon, Dr. E. A. O. Travers, who had returned from leave in June, 1901, and the matter was favourably considered by the Government.

Klang was, however, to become much worse before the year was over. It has been difficult to obtain definite information with reference to the exact amount of sickness, owing to the outbreak at Port Swettenham coinciding with this and throwing so much extra work on the hospital. I question, however, if more than three houses in the whole town escaped infection during the last four months of the year. The following extracts from my notebook will serve to show the extent to which it prevailed among Government servants. These cases occurred in the three months September, October and November.

(1) In the new clerks' quarters: (*a*) Government officer and his wife were attacked—wife died. (*b*) Government officer and his father attacked. (*c*) Government officer, wife and child attacked. (*d*) Government officer attacked. (*e*) Government officer, wife and brother-in-law attacked.

(2) Old clerks' quarters: Four Government officers were attacked.

(3) In another quarter: (*a*) Government officer, (*b*) his mother, (*c*) wife, (*d*) child, (*e*) aunt, (*f*) nephew, (*g*) and servant were attacked, and in the adjoining house a Government officer and his servant.[1]

In addition, I knew of cases in the Post Office, Railway quarters, Rest house (five cases), Inspector of Police's quarters (six cases), District Officer's quarters, District Surveyor's, District Surgeon's (three cases), of many cases among Government officers not living in Government quarters; in fact, I think two Government clerk's quarters and the dressers' quarters on the hospital hill were the only ones to escape.

[1] The commonest source of infection is the native servant, who acquires the disease from frequenting the houses of his friends in town at night. In the great majority of house epidemics it was found that a servant had been ill first of all, and that this was followed by an epidemic in the household. The following is an example of this: On March 5th, 1901, a syce was seen ill with fever. He appears to have been the starting point of the disease, for on March 20th two Europeans and the syce's wife, and on the 22nd a Chinese boy, in the same household were attacked. The danger of keeping infected servants in a house has been so frequently impressed upon me, that now I strongly advise people to send the servant into hospital until he is well. On more than one occasion I have seen a house epidemic follow a neglect of this warning, although I have deliberately informed the people that I would watch with interest the dates upon which the successive members became ill. On the other hand, prompt removal of the servant until his blood was free from parasites, along with the daily administration of quinine to the other servants for a fortnight, and the use of the mosquito net, has, I think, repeatedly prevented the disease spreading.

The Government quarters are mainly on elevated ground, and if such were the condition with them, that in the lower-lying town can be easily imagined. I knew of one household where five out of six were ill; another where the whole household, five in number, went down with fever; another where six were attacked; and others with two, three, and four cases. Enquiry at almost any house elicited the fact that someone was ill. A house-to-house visitation would have been most instructive, but it was, unfortunately, an impossibility with a hospital overflowing with malaria.

Indeed, so serious did the matter become, that the Chinese held a three days' "chou-chou," during which the devil was exorcised, and was duly witnessed by several believers to take his flight in divers guises.

This, then, is a fair picture of Klang in 1901, and recognising the gravity of the condition, Government not only put on the estimates for 1902 the $10,000 for the drain, but in addition gave $10,000 for filling in swamps instead of the modest $1,000 asked for by the Board.

Work done in Klang.

During 1901 the Sanitary Board gardeners were kept busily employed felling jungle and clearing undergrowth within the town. Notices were served on owners of private land to do likewise, and as a result the town was considerably opened up.

In 1902 money became available for draining and filling in. The latter was at once proceeded with, so that before much of the year had passed practically all the permanent swamps had been filled in. The swamp in the centre of the town was very early dealt with.

With regard to the main drain there was some delay, as the original plan was superseded by one made by the State Engineer, Mr. B. P. McGlashan. This (fig. 2), consisting of a concrete invert only with turf sides, has been found a complete success. By means of this drain a small quantity of water or sewage has always a clean run, while the storm water of a tropical thunderstorm also finds a sufficient outlet. In addition, the turf sides allow of much better drainage for the subsoil than a few weeping holes in a brick drain. This type of drain is one strongly to be recommended for tropical countries, not only for its efficiency, but also for its greater cheapness, than a drain bricked up to a ground level. Where the drain runs under the railing a flap valve was fixed to prevent the tidal water entering, and the drain is thus rendered more efficient.

Not much could be done in the way of draining the foot of the hills until the main drain was completed; but some drains were cut. The method of draining universally adopted by the planters has been found most effective. It consists of a drain following the contour of the hill at its lowest points. It taps all springs and prevents the flat land becoming swampy. Fig. 3 shows a swamp dealt with by this means, while fig. 4 shows another swamp dealt with by means of filling, and with a central drain and numerous subsidiary drains. The drawback to this method is that the subsidiary drains will almost certainly fail to tap

some of the springs. This has been the case in the present instance, and arrangements are now being made to have a contour drain cut.

Although a considerable amount ($5,000) of the money available still remains to be spent, early in 1902 filling in had been done both by Government and private owners to such an extent that the main mosquito breeding places within the town had been destroyed. There still remain many small places; but these are gradually being dealt with. The complete scheme for draining the whole town will be finished within the next few months, and the introduction of a good water supply at the end of the year has enabled the Sanitary Board to order the closure of all unused wells and most of those in use.

PORT SWETTENHAM.

The site chosen for this town was at the junction of the Klang and Langat Rivers, and the land for a short distance from the sea was covered by mangrove. All high tides covered it to a depth of several feet. The railway from Klang was carried along the foreshore, and along with a small bund, held the sea-water out. Unfortunately it also served to retain the rain-water, and no definite scheme of drainage had been adopted, each engineer cutting or blocking up a drain to suit the requirement of the moment. The result was many breeding places for mosquitoes—artificially created—with the railway bund.

Apart, however, from the effect of the railway undertaking, there were vast numbers of breeding places among mangrove trees and stumps. Here crabs raise mounds, and between these small pools of water are found. Certain of the pools, situated on the zone of land, covered by spring tides only, become as the result of heavy rain comparatively fresh-water pools, and at times I have found these at Port Swettenham to be teeming with the larvæ of Anopheles. This I regard as the real danger of a mangrove swamp—and there were large tracts of this at Port Swettenham.

It was obvious enough what ought to be done, and on February 23rd, 1901, there was a meeting of the Resident Engineer for Railways, Acting Harbour Master, District Officer and myself, when the matter was discussed, and the Resident Engineer for Railways undertook to do as much as possible with the money available. A number of stagnant drains were filled up, and filling in was done around and below some of the houses; but the work was too great to be done by the money available.

On April 20th, 1901, at the request of the Acting State Surgeon, Dr. Lucy, I forwarded a report with recommendations as to what should be done. These included, among other things:—

(1) Clearing and levelling and putting under a short native grass the Government reserve.

(2) The filling in of unnecessary drains.

(3) A complete scheme of drains which would promptly carry off and prevent the stagnation of rain-water.

(4) The notification, and, if considered necessary, the removal to hospital, of cases of malaria; and, finally, experiments with mosquito-proof houses, and quinine on certain sections of the Government servants.

Further, I expressed the opinion that the Government staff "shortly to be stationed there will be seriously affected," and their services much impaired.

Practically nothing more was done until September 15th, when the whole business of the port of Klang, with all the Government population connected with the shipping and loading coolies, were transferred to Port Swettenham. It appeared that if anything was to be done by me it must be in obtaining accurate statistics with regard to amount of sickness, in order that the serious condition of affairs might be realised by others, and also that, if any work were done, there might be some basis for comparing the condition before and after.

The introduction of a large body of moderately healthy people into what was expected to be a very malarious locality presented a good opportunity of obtaining certain statistics, which would certainly be of interest, if not of value. Accordingly, I arranged for a census to be taken by the Acting Deputy Health Officer of all the persons living in Government quarters at Port Swettenham. Each house or quarters had a separate sheet, with the following columns: Number, name, age, previous history of malaria, date of arrival at Port Swettenham, date of attack, date seen, nature of parasite, if sent to hospital or not, date of return to duty, remarks. The previous malarial history of each individual was carefully gone into and recorded.

This list was started on September 15th, and was completed within a few days. Thereafter, in order that each case might come to my knowledge, instead of trusting to notification by the individual, the Deputy Health Officer visited each of the Government quarters daily, and noted any cases of sickness, supplying quinine where required, and seeing to the transfer of the patient to hospital, where he could not be properly looked after at home. As far as possible all officers ill with malaria were transferred to hospital, and to remove one of their objections to this, I asked for, and Government granted, a free journey on the railway to any officers travelling to hospital by a surgeon's order.

On October 12th, *i.e.*, in less than a month from their arrival, the remnant of the 180 wharf coolies left in a body for Klang. Other batches of coolies arrived on October 10th and 20th, and were lodged in Klang, travelling back and forwards to Port Swettenham by a special train. After a month these also left, and for some time there was a considerable difficulty in unloading the ships. Some, indeed, had to leave with part of their cargoes undischarged.

Within two months, 41 out of 49 Government quarters were infected with malaria; and of the Government servants, including the crews of the yacht and launches who arrived before October 31st, 118 out of 176 were attacked before the end of the year, most of them within two months of their arrival. This meant that the Railway and Marine Departments were carried on with the greatest difficulty. Masters of ships found their crews overcome with the disease, and in many cases there were hardly enough men left to navigate the ship. Desertion was common at Singapore and Penang, and fresh crews refused to sign.

Matters having come to a climax, a Commission was appointed, consisting of the Director of the Institute

for Medical Research (H. Wright), the State Surgeon (E. A. O. Travers), the District Surgeon, Klang (M. Watson), the General Manager for Railways (C. E. Spooner), the State Engineer (P. B. McGlasham), and the Resident Engineer for Railways (A. J. Watkins, and later, D. J. Highet), to consider the question and make recommendations. The question of reopening Klang as the port was discussed by the Commission; but on its being pointed out that Klang was practically as bad as Port Swettenham, it was decided not to recommend this. The works necessary to improve the sanitary condition were obvious, and the measures which I had recommended in the previous April, viz., filling in, draining, felling, and the use of mosquito-proof netting, were those which the Commission advised. The State Engineer prepared a scheme of drainage, which was put in hand by Government at once. The plan adopted was to construct a bund round the whole area and protect the drains, opening through these, by flap valves. Part of this bund already existed in the railway embankment and that part of the Pendamaran Road which extends southward from the Kuala Klang Road. A new bund (A) was made from this junction, north to the rail way, and another (B) running westward from the Pendamaran Road to the railway terminus. These completely enclosed the area to be dealt with.

Fully two-thirds of this area was covered by mangrove and other forest, and this was felled. In addition, a considerable amount of felling was done to the south of Bund B.

The Commission also recommended the use of mosquito-proof wire netting in all the houses, but before this could be obtained the epidemic had materially subsided and it was not found necessary. However, although the work was carried out with great rapidity there was an interval before the swamps and pools could be drained, and during this interval three men were employed under the Deputy Health Officer to pour kerosine oil over all stagnant water.

In addition, I arranged for the distribution of quinine to Government officers, and in one department where, on November 23rd, no less than thirty-eight men were sick, there was a parade every second day and each man had to swallow quinine x. on the spot. Later on, from about the beginning of December all Government officers were offered quinine every second day. At the railway station the coolies on their arrival in the morning were passed through a barricade and every man offered quinine. About half of them took it.

To supply the needs of the coolies, &c., a few native houses had been run up. From September 15th to November 15, twenty-five out of twenty-seven of these houses were infected, and of the inhabitants, seventy-eight out of 127 attacked. Among these also quinine was distributed regularly and all sick were urged to come to hospital.

Coincident with these operations malaria began to decrease. I am sure, however, the decrease was partly the result of the seasonal decrease, evident in other years, and which fortunately came to the rescue of both Klang and Port Swettenham. Nevertheless, I think the steps taken undoubtedly hastened the improvement.

The success of the bunds and the drainage within the area has been almost complete. There still remains a few small areas, mainly where the filling in has settled down, and pools are found after showers. But nowhere do these last for more than twenty-four hours after a shower, and more filling in is now being done.

(To be continued.)

MUNICIPAL SEWERAGE.

By Major Fred. Smith, R.A.M.C.

(*Continued from page* 334.)

Domestic Drainage and Conservancy.

(5) *Pail System.*—The pail is generally of iron, zinc, or galvanised iron, but wooden ones are also used. Practically it is a movable privy. Its supposed advantage is that, for the purpose of emptying, it can be taken away without disturbance of contents, and at the same time be replaced by a clean pail. The pail is placed under any kind of seat, and there are many contrivances for facilitating access to the pail. Sometimes the pails contain excreta alone, in other cases ashes, dry earth, and so forth, are added. The ashes or earth may be put in by each person using the closet, or at intervals by some one told off for the purpose, or, again, by an automatic arrangement. The household cinder sifter may be so arranged that the ashes which pass between the bars are conducted into the closet pail. A variety is the Goux system, in which the pails are lined with dry absorbent material. The chief aim of all these additions is to render the excreta less offensive by reducing the odour. Underlying this, however, is the idea that whatever smells badly must be injurious to the human organism. In reality, also, the covering of the excreta completely prevents access of flies thereto.

The pail system is that chiefly used in the tropics now, and it is largely in vogue at home and in non-tropical lands. Indeed, in the form of the dry earth system it has long been regarded by Anglo-Indians as the ideal plan. The said Anglo-Indians as well as the Anglo-Malayan and the rest of the oriental and occidental British being mostly men of intelligence, leisure, and comfortable pecuniary circumstances, have been able to ensure perfection in the carrying out of the system, each in his own house. Odour is reduced to a minimum, excreta are removed daily, there is nothing to get out of order. He sees it in use in barracks, where strict supervision results in some amount of success in the attainment of the ideal aimed at. His own immediate surroundings are free from nuisance. He is happy.

Not long ago in a castle on the West Coast of Africa, I saw a pail closet which opened at the back on to a flat roof for collecting drinking-water—both the roof and the closet floor were on the same level. On my suggesting that this was rather a dangerous thing for other people, though convenient for the persons using the closet—I was told that So-and-So was "a very careful

man." Dysentery and various fevers are not unknown in the part of the world I speak of; for aught I know the arrangement above detailed still exists. Such frightful death-traps are common all the world over if looked for. I mention this case merely in illustration of the unwarranted confidence of pail users—man is not individually altruistic with regard to his sanitary arrangements.

Still, there is a good deal to be said for the use of pails, especially as regards the householder, provided the pails fit the seat; that they are of such shape and so accurately placed that fæces and urine do not pass outside as well as inside, thus fouling the pail and the place on which it stands; that they are never filled so full that the contents slop over the sides of the pail in the course of removal. But as a matter of fact these conditions are scarcely ever fulfilled among the lower classes. The combination of care required to make the method successful can hardly be hoped for. Thus (1) The pail-maker must supply a properly shaped oblong pail with an anterior lip projecting well under the front of the seat and a handle behind. (2) The builder must make a water tight receptacle for the pail, it must slope backwards and converge into a drain or catchpit. In the centre of its floor must be a slot into which the bottom of the pail fits accurately, but easily. (3) The carpenter must fit the seat so that the hole accurately corresponds with the centre of the top of the pail. (4) The place should be easily got at from behind and the posterior opening should be large enough to admit of the removal without tilting of the pail. (5) The man who changes the pail must do his work punctually at the prescribed intervals or the pail will overflow. (6) In putting in the empty pail at night he must be careful to fit it into its slot. (7) Each person using the closet must be careful to do so in such a manner as to make sure that the pail is receiving all the fæces and urine passed. (8) The number of persons per pail must be limited.

Now if we take the trouble to visit a dozen or so pail closets in succession we shall certainly find: here a round pail with no handle; here a pail with a dent in the side causing a leakage; here a pail receptacle which is either bare earth or cracked masonry, sloping anywhere but towards a drain or pit and so situated that the most patient scavenger finds it difficult of access for changing pails; in another closet there is no spot marked for the pail to stand on, it has been carelessly placed that only one half of it is under the seat hole and excreta are on its sides and on the floor. The next place is even worse, the pail has been forgotten altogether, one has been removed and no fresh one supplied—the people use the closet all the same; here a pail has evidently not been emptied for weeks, and is overflowing, while in the next house one is in the same state because too many people use it; here is a high seat and no foot rest so that the user is tilted forward and his motions are apt to go behind the pail.

Supposing the dry earth system to be in use a difficulty of its successful application to large communities lies in the fact that ignorant, very busy, hard-worked, or poor people, especially natives, will not take the trouble to use the dry earth, even if it can be had for nothing; and as far as my experience goes, it is by no means the rule to find dry earth at hand in barracks, civil and military hospitals, private houses of the better classes, schools, &c., where the conditions are most favourable and efficient working of the system might be looked for.

There are serious disadvantages of the pail system to be mentioned under the head of municipal sewerage.

It is seen then that there is much to be said both for and against the pail system as far as regards household arrangements. For the ordinary run[1] of people, natives particularly so, it is not sufficiently automatic; it requires too much care and thought on the part of individuals. But in theory it is good. The reader will perhaps say to himself at once: but is there any system which will work perfectly without the exercise of great care by the people who are utilising it? To this the reply is: perfection can be aimed at only, it will never be attained absolutely.

The system which will commend itself most, which comes nearest to perfection, will be such an one as will be least likely to get out of working order, which can do least harm under the circumstances in which individual control is wanting. It may be that in some conditions of life this would be found in the pail system. I am, however, rather anticipating conclusions, and will pass on to the next in order of the list of systems.

(6) *The Water-closet with Cesspool.*—The water-closet discharging into a local cesspool—that is to say a separate cesspool for the w.c. or w.c.'s, of each house or group of houses.

To give details of the varieties of water-closets would be beyond the scope of this article. Suffice it to say that the water closet is a mechanical contrivance in which deposited excreta are flushed away by water into pipes which lead to some larger receptacle—in this case a cesspit not very far away. The water may be thrown into the closet by hand-bucket or by pulling up a valve which liberates water from a tank. The closet may be for one person only to use at a time or be a trough which more than one can use.

The essentials of a good water closet are:—

(1) The pan should be smooth and non-absorbent, so that it may not become offensive owing to adherent or absorbent fæces.

(2) It should be so fitted to the drain pipes that it does not leak.

(3) It should be trapped by a bend in the exit pipe in order that the water in the bend may act as a seal to prevent foul gas coming from the drain pipes into the closet.

(4) On the side of this trap farthest from the closet should be a ventilating shaft leading into the open air—this to prevent gas at high pressure from forcing the trap. The ventilator should not open near a window or chimney.

(5) There should be an adequate supply of water for flushing.

Providing a closet fulfils these requirements, *and is carefully looked after* it is not likely to be a source of illness (our chief consideration) or even discomfort.

[1] The pail system makes no provision for waste water.

Any *reputable* builder nowadays would construct such a closet as a matter of course if ordered simply to make a good water-closet.

There is no objection to pouring slop water into the closet provided it is not thrown in in such volume that the closet-pan overflows.

As for the remainder of this system, the drain pipes should not be too large in proportion to the size of the closet. They should be of smooth glazed earthenware, properly fitted, the joints cemented, and the pipes set in cement. There should be a second trap near the cesspool—the cesspool should have a couple of ventilating shafts. Pipes from the sink or from a second closet should join obliquely in the direction of the flow, and. preferably, with a slight fall into the principal pipe.

The cesspool is usually a roundish bricked pit. It is supposed to be cement-lined, or to be of impervious bricks set in cement, that is to say, water-tight. Needless to say, it rarely is water-tight. The cesspool is covered with a slab of stone or sheet of iron, and over this a foot or so of earth is piled. The cesspool may be emptied by private arrangement with men who make a livelihood by removing night-soil, and as a rule please themselves as to the mode of removal and the ultimate disposal of the soil. In some places the local sanitary authority empties cesspools periodically, or when requested. In actual practice the cesspool is cleared out at much longer intervals than it is supposed to be. Inspection manholes are not generally provided on the drain pipes leading to cesspools; therefore, there is no indication except the overflow of the w.c., that the cesspool is full. There is, however, no reason why an inspection hole should not be provided in order that the state of affairs in the cesspool may come to light before the catastrophe above mentioned occurs.

The things to be said for and against the w.c. and cesspool combined may be summed up as follows:—

(1) The excreta are removed at once.

(2) Flies can gain little or no access to them.

(3) There is no stale fæcal odour making the air unpleasant.

(4) There is no daily danger of polluting the ground as in conveying pails, &c., to a cart.

(5) The slop-water may be allowed to go into the w.c., or direct into the cesspool.

In fact, all the evils of the pail system are absent as far as the closet is concerned, and provided the thing is in working order. But it is very apt to get out of order through misuse (see the next section), as well as from faulty construction. A special evil of the system now being dealt with lies in the clearing out of the cesspool. True, this is not done very often, and is therefore in that respect less dangerous than the frequent removal of pails. But the clearing out is such a difficult performance that it cannot well be done without fouling the surrounding ground, the carts and so forth. The least objectionable system would be by a fixed pump, high enough to pour the contents of the pit directly into a water-tight cart, and having a drip-catcher leading back into the pit; but in the majority of places the pit is so situated that a cart cannot get near it. For all that, the w.c. and cesspool is the best of the systems mentioned heretofore.

Cesspools and Wells.—There is one danger which ought to be mentioned, viz., the pollution of wells. But this is not an essential part of the system—for the well situated dangerously near to a privy ought not to be used. For that matter no drainage plan that we know of is safe unless it is properly carried out, and this I shall have had occasion to remark more than once in my article.

The Life of a Cesspool.—When a cesspool is situated in porous ground and is not water-tight it lasts an astonishing length of time without requiring to be emptied. In fact, it would almost seem that in some cases they never would really require clearing out at all, as they contain little more than water. Indeed, it is not an unusual experience on taking over a house on hire that the outgoing tenant is not quite sure in what part of the grounds the cesspool is to be found.

(*To be continued.*)

A Reuter's telegram dated Bulawayo, October 5th, says that Dr. Koch's report on redwater advocates the inoculation of healthy cattle with the blood of animals that have recovered from the disease. The report adds, however, that the inquiry is not yet completed, and that it would be premature to expect too much from the proposed remedy.

Infantile Diarrhœa, with Green Stools.

℞	Dil. lactic acid	♏iv.
	Tincture lemon	♏i.
	Syrup	℥ii.
	Seng	℥ii.

M. Sig.: A teaspoonful thrice daily after feeding.

—*The Med. Times and Hosp. Gazette*, Oct. 10th, 1903.

The Staining of Bacterial Flagella with Silver. —J. W. W. Stephens, M.D.Cantab., Walter Myers Lecturer on Tropical Medicine, University of Liverpool, in a paper read before the Liverpool Congress of the Royal Institute of Public Health, and published in the *Journal of State Medicine*, October, 1903, gives the following method of staining bacterial flagella with silver:—

I use the following solutions.

(1) Van Ermengem's mordant of osmic acid and tannin, one half to one hour.

(2) A 0·1 per cent. solution of silver nitrate.

(3) Five per cent. tannic acid + per cent. NH_3 solution (*partes æquales*).

Wash off the mordant thoroughly with tap-water.

Pour some of the silver solution with a pipette over the slide, then add a few drops of the ammonium tannate solution till a deep reddish-brown colour is produced, and allow to stain for a minute or so, or as long as no black precipitate is formed.

Wash off in ordinary tap-water.

Repeat this procedure two or three times until the film has a deep brown or somewhat black colour.

This method has given good results.

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THE

Journal of Tropical Medicine

NOVEMBER 16, 1903.

PRIORITY IN SCIENTIFIC DISCOVERY.

How frequently does it happen that the question of who first discovered a microbe or enunciated a theory causes heart burnings and bitter recriminations. The friends of the claimants range themselves with the hero of their belief in opposite camps, and assail their opponents with vigour. Not infrequently the question of nationality comes up and, when that element is introduced, the acrimony of a home or family squabble may be less, but only to give place to a sullen and defiant attitude, combined with a comprehensive sneer at the whole nation, its people, their customs, and especially their scientific effrontery. It is a time-worn saying that science knows no nationality; that may be so, but it is to be feared that there are but few scientists whose horizon is not only limited to their nation, but even to their city, their parish, their University, to themselves, in fact. Such it has been and such it always will be. Should the author himself hesitate to assume the weapons of contention, his followers will warmly take up his cause, and advance their standard. Around the earliest writings known to man there has arisen within recent years a discussion as to their authorship. Moses is declared not to have written the five books of the Old Testament associated with his revered name; yet more recently some one has accused St. Paul of subscribing his name to epistles he never wrote. The authorship of the writings usually ascribed to William Shakespeare has even aroused animated discussion, and by people who have evidently nothing else to employ the spare time which, most unfortunately, is vouchsafed to them. The shadow is left for the substance, the divine gift for the medium by which that gift was granted us. We care not who wrote the epistle to the Hebrews, so long as the divine teaching and testimony it contains is ours; nor does it affect the intrinsic worth of Shakespeare's works to know who wrote them; we accept them and are thankful. In the same way we value the scientific truths enunciated by our investigators and we endeavour to esteem the discoverer according to his deserts. Now and again two or more men claim the discovery; they may be resident in different countries, aye, even in different continents, yet do they well-nigh simultaneously declare their discovery. To whom is the palm to be given? In all probability each will become the hero of his nation and there may be good grounds for the worship accorded to both. The Italians claim a discoverer of the circulation of the blood, as we claim it for Harvey, and in the more narrow fields of enquiry the question of priority causes international and personal contention. Who found or first published an account of a new disease or a bacillus, is an ever-present cause of disputation, and never more acutely than to-day. The facts are, that few men have personally evolved an original conception and worked it out to a conclusion. In tropical medicine we are in the midst of ques-

Photographs illustrating article on Goundou, by Dr. ANDREAS NELL.

Bale, Sons and Danielsson, Ltd.

tions of the kind. A complete piece of work like Manson's filarial investigation, in which he not only settled the habits of the parasite, but also proved that the mosquito was the carrier of the filaria to man, has seldom if ever been surpassed in importance or in scientific acumen. Koch's discovery of the cholera bacillus was merely an excellent piece of bacteriological and microscopical investigation in comparison.

Since Laveran discovered the malaria parasite many workers have elaborated the pathology and etiology of the disease—malaria ; others, such as McCallum, Manson, Ross, Golgi, Grassi, &c., having contributed definite and important steps in the elucidation of the behaviour of the parasite and of its mode of conveyance to the human body. One step has led to another and it is difficult in some instances to ascribe definitely the part that each played in bettering our knowledge. Lately we have been passing through a troublesome time concerning the subject of trypanosoma, and the question of the priority of the discovery of the presence of the parasite in man and the bearing it has upon sleeping sickness. We would urge upon all men to take to heart the statement of Sir Alfred Jones in his speech at the Colonial Institute on November 11th. "We care not whether the work is done at the London or Liverpool School of Tropical Medicine, in Hamburg or elsewhere, what we want is to see the work done. We are fighting a great problem, namely, how to render our colonies healthy, and we have no concern or patience with individual or national jealousies." Let us, whilst being anxious to accord our scientific workers all honour and to see that their contentions are fairly dealt with, never forget that many men's minds frequently travel contemporaneously in the same direction, and should one by his commanding genius or from opportunity, gain the ascendancy, the matter is not one of this or that school or university, or this or that individual, but whether or no the discovery or observation is a real acquisition to our knowledge and a benefit to mankind.

MAJOR ROSS ON MALARIA AND THE DUTY OF THE STATE IN THE PREVENTION OF MALARIA.

Major Ronald Ross, C.B., at a meeting of the Colonial Institute on November 11th, gave an address on malaria before a large audience presided over by the Right Hon. Sir George T. Goldie, K.C.M.G. After dealing with the ravages committed by malaria in India and the Colonies, and showing its prevalence amongst the infant population, the lecturer contended that malaria was the chief enemy of the pioneer, the traveller, the planter, the engineer and the soldier ; in other words, of those who were instrumental in promoting the welfare and advance of the Empire. The means of arresting the baneful influence of malaria, since we know the etiology of the disease and the means by which it is spread, resolves itself into a question of prophylaxis. Of the means to hand, the mosquito net claims the foremost place, and as useful adjuncts we have punkahs, quinine and wire-gauze screened windows and doors. Quinine could not be considered a true prophylactic, since it did not prevent the entry of the parasite into the blood, but merely killed the parasite after it had gained entrance. Separate localities of habitation for whites and natives would no doubt contribute towards protecting the whites, as it is chiefly from native children the disease is acquired ; but such a step is not always possible, and it would not tend to diminish the disease amongst natives upon whom devolves the manual labour required in the Colonies. A great source of ill-health is the ignorance of the Europeans in tropical countries to accept modern scientific teaching ; they regard the malaria mosquito theory and its practical bearing with indifference or even contempt. In several districts, however, intelligent men had secured a triumph over ignorance and improved the health of the colony or city they live in ; notably so has this been the case in Havana, Lagos, Sierra Leone, Hong Kong, Ismailia, Klang in Malay Peninsula and several other places. The question of the suppression of malaria must be taken up by the local governments of our colonies and dependencies. To every populous centre a medical officer of health, in an independent position, should be appointed ; a district commissioner responsible to the highest authority only should control the work of the officers in a given area, and should issue systematic reports from time to time.

Sir Patrick Manson, in supporting the principles enunciated by Major Ross, advocated the instruction of all persons, Europeans and natives, dwelling in malarial districts, and especially of the local government officials. He would test the opinion of all such officers, and if he found them ignorant of, or indifferent to, the modern teaching of science in regard to malaria, he would cancel their appointments, as the best way of improving the health of the colony they resided in. This necessity was well exemplified by the statements of the next speaker, Sir F. Swettenham, Governor of the Straits Settlements, who declared his disbelief in the finality of the mosquito malarial theory. Had the ladies and gentlemen attending the meeting been asked to vote

whether a man holding such opinions was a fit and suitable person to be entrusted with the lives of our fellow-countrymen in the Tropics, it was quite apparent he would have received an adverse vote. Sir Alfred Jones arrested the laugh that Sir F. Swettenham had attempted to raise against prophylactic sanitary measures by saying this was no joke they were considering; the problem of how to render our colonies healthy struck at the very core of the Empire's existence. He deprecated jealousies between schools and individuals, as to who did this and who do that. They were indifferent where the information came from, although naturally we would like to see our own countrymen well to the fore. What Sir Alfred wanted to see was the work done, he wanted to see our colonies made healthy so that the pioneers and merchants who go to our colonies may be spared to us, and the possibility of commercial enterprise ensured against ruin through ignorance, bad sanitation and ill-health.

SLEEPING SICKNESS.

Lieut.-Col. Bruce, R.A.M.C., F.R.S., Dr. Nabarro and Captain Greig, I.M.S., during their enquiry into the etiology of sleeping sickness in Uganda, have arrived at the following conclusions: They have confirmed Dr. A. Castellani's discovery of the presence of the trypanosoma in the cerebro spinal fluid of persons suffering from sleeping sickness, and bear out his statement that the parasite is the cause of the disease. Monkeys inoculated with the cerebro spinal fluid of patients suffering from sleeping sickness subsequently presented the symptoms of the disease. Monkeys inoculated with the blood of persons not yet showing symptoms of sleeping sickness, but in whose blood trypanosomes were found, also developed the symptoms of sleeping sickness. They proved also that sleeping sickness in Uganda is limited to districts in which the tsetse fly, *Glossina palpalis*, occurs, and that where this fly does not occur sleeping sickness is absent. The last observation bears out Dr. L. Sambon's prediction that the tsetse fly would be found the medium of transmission of the disease (Journal of Tropical Medicine, July 1st, 1903). The evidence before us affords a strong presumption that the disease, sleeping sickness, is connected with, if not actually caused by, the presence in the cerebro spinal fluid of the parasite trypanosoma.

About 25 per cent. of the cases of typhoid fever show typhoid bacilli in the urine. The bacilli may persist in the urine for months, thus constituting a grave danger to the public health when the patient is convalescent. Urotropin is considered efficient in causing the disappearance of the typhoid bacilli from the urine.

British Medical Association.

DISCUSSION ON TRYPANOSOMIASIS.

III.—J. Everett Dutton, M.B., Ch.B.(Vict.), and J. H. Todd, B.A., M.D., C.M.(McGill).

Liverpool School of Tropical Medicine.

Researches on Trypanosomiasis in West Africa.[1]

(*Continued from page 345.*)

Synopsis of Results of Experimental Inoculations of the Two Diseases into Lower Animals.

Monkeys.—The dog-faced monkey, *Cynacephalus sphinx* (Desmoulins ?) is insusceptible to either horse or human parasites. We have experimented with nine of these monkeys. The small mangrove monkey (species ?) is very susceptible to horse trypanosome (only obtained one specimen of this monkey).

Rabbits die from horse trypanosome in about one month and a-half; with the human trypanosome they appear to thrive and increase in weight, though parasites are seen in their blood in small numbers occasionally.

Guinea-pigs, with horse trypanosome, die in about one month; with the human parasite one lived for four and a-half months. Marked *post-mortem* changes in those animals inoculated with horse trypanosome.

Dogs (*pups*) die in two to three weeks from horse trypanosome; two inoculated with the human parasite have grown into quite big dogs, and have been sent home.

Old Dogs.—One large bitch (sent home) inoculated five months ago with horse parasite, is still alive and well; no parasite has been seen in the peripheral blood, but the blood is pathogenic to rats. Another grown-up dog died in a month after inoculation with horse trypanosome.

Large bush rats (*species ?*) are very susceptible to horse trypanosome. With human parasite they live and thrive, though organisms are more frequently seen in their blood than in the animals inoculated with the human parasite.

Mice (*house*) die from horse trypanosome in two to three weeks; with human trypanosome live much longer.

Hens.—African hens are insusceptible to horse trypanosome, one sent home inoculated several times.

Cows.—We have infected a cow and a calf with horse trypanosome. These animals have lived for two months and four weeks respectively. N.B.—We have never found the disease in cows naturally.

Goats.—None have died from horse trypanosomiasis, while two inoculated with the human parasite have died, one a kid, in three months. Another goat inoculated three months ago has lost much weight, and shows many trypanosomes in its blood.

Rats.—Rats can be inoculated with the human disease, though none have ever died of it alone; while rats infected with horse parasite die as a rule in about four weeks.

[1] This communication was addressed in the form of a letter to Sir Patrick Manson.

Discussion of Results with Reference to Identity or otherwise of the Two Parasites.

The above inoculation (primary) experiments show a distinct difference between the diseases produced, in animals, by the human and the horse trypanosomes. The horse parasite is the more pathogenic, and after death obvious *post-mortem* lesions, namely, enlargement of spleen and glands, the latter usally hæmorrhagic, are found. The "disease" caused by the human trypanosome is very chronic, the animal's health does not seem to be affected, and in the only deaths which have occurred in animals infected with this parasite no macroscopic lesions were perceived. In the early stages of both diseases the continued presence of the parasites in the peripheral blood is far from the rule. This tendency to disappear from the peripheral circulation is much more marked in the human parasite. In the later stages of the horse disease (a week before death) the presence of parasites is constant, and their numbers gradually increase until death takes place. The morphology of the two parasites presents, so far, no characteristic differences. There are, it is true, a few minor points in which they differ, but before anything definite can be said a careful study of stained specimens will be necessary. From a consideration of the above facts it is impossible to decide whether the parasites found originally in horse and man are the same or different. The one clear distinction we can draw at present is the marked dissimilarity of the disease produced by inoculation in lower animals.

Transmitters of the Diseases.

Here, unfortunately, we have to disappoint you as much as we ourselves have been disappointed, by saying that our results are negative. We tried many times in vain to transfer both parasites by biting flies to healthy rats from either naturally-infected horses or artificially-inoculated animals. Two species of flies, Stomoxys and Glossina were used. If the method of transmission of this disease were, as is maintained, simply a mere mechanical transference of parasites from one animal to another by means of the insect's proboscis, we think we should have obtained some results in our experiments. Perhaps, however, it may be that the parasite cannot live for even a few hours in the insect's proboscis during the dry season owing to the excessive lack of moisture in the atmosphere. At McCarthy Island, where some of our experiments were undertaken, there was a daily difference of from 15° to 20° between the wet and the dry thermometer bulbs. Mr. Hewby, a travelling commissioner in Northern Nigeria, has told us of an observation, based on a very careful study, which seems to be interesting in this connection. He noticed that his ponies after passing through a certain bit of bush in the wet season often became ill and died of fly disease. Ponies sent through the same bush in the dry season, however, escaped, although the flies, which he says are the same as the Glossinæ, which we showed to him, were always present in great numbers. We should have liked to have given you our results in a more detailed way, but it is impossible, as our notes are not yet completely arranged or our animal experiments completed or fully worked out. We hope before we return to the Congo to publish as far as possible a complete account of the animal experiments up to date, and to give a description of about six species of trypanosomes found in frogs, birds, tortoise, and mice.

LATHYRISM.

By Major A. G. Hendley, I.M.S.

The best definition of this affection is Scheube's. which not only sums up in a few words prevalent opinions as to its causation, but at once recalls the nature of a too narrowly-known disease of importance. He says: "Lathyrism is a disease of the nature of an intoxication with a spastic spinal paralytic course, which is attributable to poisoning with various kinds of the family of *Papilionaceæ lathyrus* (chick-pea or common pulse).

Dr. Watts, in his "Dictionary of the Economic Products of India," says: "Lathyrus, a genus of annual or perennial plant of the natural order *Leguminosæ*, which comprises some 170 species, seven of which are natives of India." The specimens I have here are of the commonest cultivated Indian variety, *Lathyrus sativus*, known in different parts of India under various vernacular names, as *khesári dáll, teóra, lákh*, or *lákhóri*. To quote Dr. Watts again: "*Lathyrus sativus* (jarosse or gesse) is indigenous from the Southern Caucasus to Northern India; it has spread as a weed of cultivation from its original home, and is now cultivated all over India." In the Central Provinces some 358,000 acres are under lathyrus cultivation; and it is in these provinces that the disease has of late years become so increasingly prevalent as to call for Government inquiry, which inquiry has been entrusted to Major Andrew Buchanan, I.M.S., who has for the past six months or more been devoting his entire attention to this subject.

History.

Lathyrism is no newly-discovered affection. Its history dates from very early times, being, according to Huber, alluded to in the Hippocratic writings, where mention is made of the fact that "At Ainos those men and women who continually fed on pulse were attacked by a weakness in the legs, which remained permanent." In Don's "System of Gardening," again, it is recorded, in describing *Lathyrus sativus*, that: "In several parts of the Continent a white pleasant bread is made from the flour of this pulse, but it produced such dreadful effects in the seventeenth century that the use of it was forbidden by an edict of George, Duke of Wurtemberg, in 1671, which was enforced by two other edicts under his successor Leopold in 1705 and 1714." In Italy and France the disease was also observed during the seventeenth and eighteenth centuries, and in the earlier half of the nineteenth century, large numbers of persons becoming affected in France, British India, and Algiers, attracted apparently some considerable attention. From the years 1857-68, when Dr. James Irving—then Civil Surgeon of Allahabad—contributed five very interesting and exhaustive papers to the *Indian Annals of Medical Science* on the subject

of an epidemic of lathyrism then prevailing in the North-West Provinces, down to 1893, when I described in the *Indian Medical Gazette* a localised outbreak I had met with in the Central Provinces, the disease seems to have attracted no notice, save at the hands of a few veterinary surgeons, who noted its effects on cattle, and may in consequence be assumed as practically non-existent. The circumstances under which I first made acquaintance with the affection were as follows :—

Towards the end of July, 1893, I came across a village where quite suddenly some 10 per cent. of the male population had during the previous five or six weeks (that is, since the commencement of the rainy season) become paralysed, more or less severely, in the lower limbs. At that time I had never heard of such an affection as lathyrism, but careful investigation and inquiry into the circumstances of the outbreak soon convinced me that they owed their condition to poisoning with *Lathyrus sativus*, a pulse on which all the affected, poor hand-to-mouth labourers had largely subsisted for some eighteen months on account of the failure of their more regular crops, in consequence of which the village landlord had paid his labourers in kind with the cheapest grain available, namely, *Lathyrus sativus*. For some years I saw no further case of this disease ; but with years of scarcity, culminating in the terrible famine of 1896-7, the local conditions artificially produced by the village landlord in 1893 became general ; the poorer agricultural labourers were driven to resort extensively to the cheapest foodstuffs procurable (lathyrus), and with most disastrous consequences. In the average village a dozen or more victims would be found, whilst in a famine relief camp of some 4,000 persons it became easy to pick out one or two hundred of such cases.

The disease has, in the Central Provinces and adjoining native States, gone on spreading ever since, helped by the second severe famine of 1899-1900 ; until at the present time Major Buchanan writes to me that he has an incomplete census of 2,700 cases in one district and 1,400 cases in another ; and in a recent letter says, " I have seen 190 cases this morning."

Symptoms.

I will now pass on to a description of the symptoms and mode of onset of the disease. For reasons, given above, it will be seen that only the poorest classes are liable to this disease ; those who are forced to subsist on the grain unmixed or diluted only slightly with other grain. All the affected will be found to belong to this class. They eat it either ground into flour as bread, cooked as porridge, or boiled with or without oil as lentils, much as we eat haricot beans. Practically all are field labourers, and the wonderful unanimity with which all agree as to the onset of the disease is most striking. A man will say : " I went to sleep perfectly well and very tired after a day's ploughing or other field work in the rain " (it is always in the rainy season) " and awoke in the morning to find my legs stiff, weak, trembling, and very heavy to lift when I rose to walk." (I have never been able to elicit any history of premonitory symptoms.) This weakness and trembling, you will be told, increased so rapidly that within ten days progression became difficult, even with the aid of sticks. Still the patients have no sense of illness and no pain ; they have good appetites, sound digestions, and natural sleep at night. Both legs are usually affected simultaneously, first the calves, then the thighs, and soon after this all sexual appetite and power was lost. All complain bitterly of this.

On examination of any typical case, of some six weeks' duration, you will find that the gait is very peculiar. Aided with a long two-handed staff walking is possible, the rate of progression being under two miles an hour. The body above the hips sways from side to side, whilst the feet, which seem clogged with invisible weights, are lifted with evident difficulty and dragged forward, the toes scratching along or barely clearing the ground. The leg bearing the weight of the body is bent at the knee and trembles, whilst the advancing leg, dragged wearily forward strongly adducted, is planted unsteadily directly in front of its fellow, the toes reaching the ground first. In short, a kind of paralytic goosestep, The general effect is one of laboured unsteadiness, due to great weakness. The evident spasm of the thigh adductors ceases to be very apparent when the patient reclines on his back, when the thighs can be separated, usually without resistance, to a normal extent. There is no wasting, no loss of muscular tone, no true tremors, only tremblings of the entire limbs when weight is put on them. Sensation seems quite unaffected. The tendon reflexes are much exaggerated, both knee jerk and ankle clonus ; the slightest stimulus starting the latter phenomenon going for a long time. There is no loss of power or undue excitability in bladder or rectum. The arms, trunk, head and neck muscles are unaffected. The mind is clear, speech natural, pupils normal and reacting naturally to light and accommodation. The urine is often of rather high specific gravity (1030), acid, and contains abundant urates. Such are the symptoms as I have found them. I am aware that some writers state that digestive disturbances, colicky pains, and diarrhœa are usually precursors of the paralytic state ; and that sensory disturbances, such as hyperæsthesia, anæsthesia, and formication, with bladder troubles, such as incontinence and retention of urine, are common. I have never met with a case in my experience of many hundreds where the slightest history or evidence of any such complications could be traced.

Etiology.

As regards the etiology of the disease, it is, I think, generally conceded now that the paralysis is in some way due to lathyrus poisoning. Other main theories of causation are :—

(1) That lathyrus eating has nothing to do with it.

(2) That if it has, it is only diseased grain which is capable of poisonous effects.

(3) That exposure to sun or some local hot wind is the true cause.

(4) That the paralysis is due entirely to cold and damp.

(5) One eminent authority on tropical medicine (Manson) has thrown out the suggestion that, like alcoholism and probably beriberi, the disease may be due to the entrance into the body of a toxin generated by germs whose habitat is outside the body.

(6) Lastly, I am quite prepared to hear some cham-

pion of parasitism arise and suggest that some organism, so minute as to have hitherto escaped observation, is really the author of all the mischief.

In the time at my disposal I cannot fully discuss these and other theories, and can only say that the occurrence of the disease in epidemic form among lathyrus eaters and among no others, seems to me very strong evidence that a lathyrus diet is primarily responsible. The idea that diseased grain only is injurious is an argument probably borrowed from the analogy of ergotism. I know of no facts to support the idea. That exposure to sun or some local hot wind can be held responsible is at once disproved by the undoubted fact that the disease has occurred (amongst lathyrus eaters) equally disastrously in India, Italy, France, Algiers, and Würtemberg, countries with vastly dissimilar meteorological conditions. Also, if exposure to cold and wet alone could induce lathyrism, England surely should be full of such cases. As regards Manson's suggestion that the affection, like beriberi, may be a "place disease," one has only to remember that the paralysis is incurable, and that removal from the locality where the person was attacked is in no sense beneficial. As to what the actual poison is, and how it acts, that is a matter still left for our eminent physiologists and chemists to decide. Church has stated the chemical composition of the grain as: Water, 10·1; albuminoids, 31·9; starch and fibre, 53·9; oil, 0·9; ash, 3·2; and has further observed that "the oil expressed is a powerful and dangerous cathartic."

Astier says, "There is present in the grain a volatile liquid alkaloid, probably produced by some proteid ferment, which exhibits the toxic action of the seeds, and the action of which is destroyed by heat." On this volatility and destruction by heat notion has been based much speculation as to the possible variations in methods of cooking, explaining the capriciousness of the effects of a diet of this grain on different individuals. Scheube says, "Several poisonous alkaloids have been extracted, but further investigations are necessary;" also, "that by the administration of preparations made from the grain, a disease giving rise to symptoms similar to lathyrism has been produced in animals."

Professor Dunstan, of the Indian Institute, is now working at this subject. So far his investigations and experiments on animals are inconclusive, but go to show: (1) That only certain samples of lathyrus are poisonous; (2) there are some reasons to think that poison is contained in the skin or husk of the seed, but no fungus has been discovered; (3) that poultry are immune, but that rabbits and guinea-pigs are sometimes affected. Professor Dunstan also tells me that in Canada lathyrus is largely grown and freely used as poultry food, so probably birds are immune. My own pigeon feeding experiments in India were all negative, and so support this view.

There remain two points of interest in connection with the causation of lathyrism, namely, its marked preference for males and its seasonal incidence, that is, during the rainy season. Dr. Irving found that the proportion of females to males attacked was about one in twelve. Major A. Buchanan, I.M.S., with a recent very large experience, tells me he finds it one in ten. I personally have only seen three female cases against many hundreds of males. Major Buchanan accepts the comparative immunity of females as an unexplainable fact, but says that the reason for the seasonal incidence of the disease is very simple, namely, that "he finds that the ordinary grain pits or granaries are closed in June, and that lathyrus grain is only issued to labourers in the rains."

The difficulty in the way of accepting this explanation is that (1) I do not believe the custom he alludes to is general—that of only eating lathyrus during the rains—it certainly was not during the recent famines; and (2) the fact that according to this idea cases occurring quite early in the rains must have been caused by a very few days' dietary of the poison; and this is opposed to all my experience of histories given me by patients. I prefer an even simpler solution of both difficulties. As long ago as 1858 Dr. Irving quoted the prevalent opinion amongst intelligent educated natives as being that, "the lameness produced by eating lathyrus was really a mixture of palsy and rheumatism," and added, "they seem to think that living on this particular grain is the predisposing cause, and exposure to cold, rain, and damp weather the exciting cause."

I believe the native idea is the correct one. I believe that lathyrus, whilst it may possibly cause paralysis by itself, ordinarily only predisposes to it, that it makes the subject ready or ripe for the attack of paralysis, but that exposure to severe wet and cold is required actually to excite the sudden seizure. This seems to me to explain the unvarying history of the sudden unexpected attack during the wet season only; for nearly always the attack occurs after an unusually thorough wetting whilst ploughing, watching crops at night, or other field work that ordinarily falls to man's lot and not to woman's. To their greater protection from severe and prolonged exposure alone, I believe, women owe their comparative immunity. I have suggested to Major Buchanan that the respective shares which exposure and a lathyrus dietary have in producing the paralysis might well be tested during the extensive animal-feeding experiments which are to be carried out at the Bombay Research Laboratory.

Morbid Anatomy and Pathology.

Satisfactory observations on the morbid anatomy and pathology of the disease are wanting. From the clinical symptoms one would be justified in assuming it to be a form of lateral sclerosis, but in Watts' "Dictionary" I find a statement that "Cantarri, of Naples, has published a number of cases in which he has carefully observed the condition after death. No affection of the spinal cord was discovered. The muscles of the lower extremities, especially the abductors, were found to have undergone a fatty degeneration, &c." Scheube mentions one published necropsy (where death resulted from malarial cachexia) where "a softening of the spinal cord above the lumbar enlargement was found." Allbutt refers to two examinations of horses which had died of lathyrus poisoning. In these the symptoms were apparently mainly those of cardiac and respiratory oppression, and after death "the mischief was found mainly in the cells of the anterior horns of the

cord, which were diminished in number and atrophied, There was also thrombosis of small arteries, which were also thickened. There was, too, fatty degeneration of the heart and intrinsic muscles of the larynx." From this he suggests that the nerve mischief may be secondary to the vascular lesions, which would suggest a similarity to ergotism. The prognosis of this disease as regards life is favourable. It does not seem to cause death directly, but the paralysis is incurable. Treatment, I believe, is quite futile.

Notes and News.

A SOLUTION of formaldehyde—one drachm to a pint, applied to the chief seats of perspiration in the body—axillæ, perineum, or the soles of the feet, will remove the odour of the perspiration.

WE congratulate Mr. J. G. Craggs upon the knighthood that has been bestowed upon him. All interested in tropical medicine have good reason to respect his name and to rejoice at the honour he has received. The London School of Tropical Medicine benefited by his liberality and wise forethought, inasmuch as he placed a travelling scholarship at the disposal of the School authorities, amounting to a sum of no less than £300 yearly for three years. The work done by Dr. C. W. Daniels and Dr. G. C. Low, the successive holders of the scholarship, must have amply repaid the generous donor, for by their investigations several important problems in tropical medicine have been elucidated and our general knowledge advanced. Mr. Craggs' latest encouragement to the study of tropical diseases is the prize he has instituted for original work, so brilliantly gained by Dr. Castellani.

THE CRAGGS' PRIZE.—The authorities of the London School of Tropical Medicine have bestowed the Craggs' Prize for the year 1902-1903 upon Dr. A. Castellani, a former student of the School, for his original work in connection with the investigation of sleeping sickness and the important discovery of trypanosomata in the cerebro-spinal fluid of persons suffering from that disease. In November, 1902, Castellani first observed trypanosomes in the cerebrospinal fluid of sleeping sickness patients, and so persistently did the disease and the parasite occur together that he came to the conclusion "that the sleeping sickness is due to the trypanosome I had found." Castellani's discovery has stimulated investigation in regards to this parasite in many directions and in many countries, and the authorities of the London School of Tropical Medicine are to be congratulated upon the bestowal of the prize upon one so deservedly entitled to receive it. Dr. Castellani is about to proceed to Ceylon to take up the duties of Professor of Pathology and Bacteriology in the College of Medicine at Columbo.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Malaria.

HYBRID MALARIA.—Under this title Dr. J. L. Porteous (*Med. Record*, July 25th, 1903) describes a disease resembling typhoid, but presenting some of the characters of malaria. He states that the blood did not give Widal's test and concludes therefore that the disease was not typhoid. The assumption that malaria played a part in the disease he describes is based solely upon the benefit ascribed to a few doses of Warburg's tincture and not to an examination of the blood for malarial parasites. In the face of such negative evidence it is impossible to decide the etiology of the so-called hybrid malaria.

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The Journal of Tropical Medicine.

CONTENTS.—DECEMBER 1st, 1903.

Original Communications.

DYSENTERY.

By Captain E. E. Waters, M.D., I.M.S.
Officiating Senior Medical Officer, Port Blair.

Dysentery is a disease which is the bane of all Indian jails. More than this, it is a disease of all large bodies of men collected together under unnatural or insanitary conditions. It breaks out in asylums in Europe, and it is constantly present in all armies in the field.

Our knowledge of dysentery has suffered in previous times from a want of precision in nomenclature, the dysentery described by one observer being quite different from that described by another. Latterly we have been able to differentiate one variety very clearly. I allude to true "tropical" dysentery, which is caused by the *Amœba dysenterica*, and is frequently followed by a single liver abscess, in whose wall amœbæ may also be found. This is the common dysentery of Europeans in the Tropics, and is quite distinct from jail or institution dysentery. The relation between this tropical dysentery and liver abscess is perfectly clear, and so also is the demarcation between the two varieties of dysentery. Briefly, tropical dysentery tends to form liver abscess, it is caused by the *Amœba coli*, and the ulcers *post mortem* often show yellow, sloughy centres, surrounded by areas of acute congestion. It need not be further discussed.

Institution dysentery is quite different. One great distinction is that it does not cause liver abscess. In the 176 dysentery *post mortems* performed here last year there was only one case of liver abscess, and this was healed and encapsuled. It had given rise to no symptoms and the pus had become white, putty-like, and inspissated. But with this exception, in all the hundreds of *post-mortem* examinations performed, and thousands of dysentery cases treated, I can find no record, written or traditional, of tropical liver abscess as a symptom or *sequela*.

The ordinary clinical symptoms I take to be very much the same in both conditions. Whatever the cause, the tenesmus, pain, and diarrhœa of dysentery or colitis appear. In institution dysentery the disease is usually slow, chronic, and prone to relapses. The *post-mortem* appearances are very constant; emaciation is nearly always noted, and there is often œdema of the extremities. The ulcerations are rigidly confined to the large intestine, though at times there is some congestion of the small intestine.

These ulcerations may be of every size and depth, but there appears to be no connection between the size, depth, or number of the ulcers and the urgency of the symptoms. The favourite sites for the ulcers are the lower rectum, the cæcum close to the valve and the sigmoid flexure, though frequently ulcers are scattered throughout the large bowel. The rectal ulcers are more often very small and shallow, sometimes almost difficult to detect, whilst the cæcal ulcers tend to be large, deep and at times almost perforating.

The outstanding feature of this disease is the pigmentation of the floor and wall of the ulcer, and often of patches of apparently healthy gut. This pigmentation varies from a light slaty-grey colour to a dark, almost coal-black, shade, but it is nearly always present. The pigment is similar to that we usually associate with malaria, and such as is seen on the tongue, gums, cheekbones, and sometimes in the liver and spleen of chronic malarials. As above stated, liver abscess is so rare as to be practically unknown, the solitary case on record having had no admission for dysentery during his nineteen years' stay in the Settlement. Enlargement of the mesenteric glands is common, and the liver and spleen often show signs of malarial degeneration. It is when we come to consider the exact nature and causation of this disease that we are met with so many difficulties, difficulties that are equalled only by those encountered in controlling the disease in a convict community.

So far as can be said at present the cause of institution dysentery is the *Bacillus dysenterica* of Shiga.[1]

[1] "Notes on the Bacteriology of Dysentery and the Value of the Serum Test," Rogers. *Indian Med. Gaz.*, February, 1903.

This organism is one of the coli group of bacilli and is akin to the *B. typhosus*, which it morphologically closely resembles. It is stated that its growths on agar resemble those of the typhoid organism, but are smaller and less opaque than those of *B. coli*. Cultures obtained from Flexner and Shiga have been found in India to agglutinate the serum of ordinary cases of jail dysentery, and these results have been obtained by Buchanan and Rogers in Calcutta, and by Pridmore at Bhamo. There is therefore reasonably good ground for believing this organism to be the cause of dysentery, even though all the canons of Koch's law have not so far been fulfilled.

How, then, is the disease spread? Is it purely water-borne, and what are the influences of food and of soil? Then, again, what is the effect of malaria, and how much dysentery must be put down to malingering, or to self-caused disease? These questions have a more than purely medical interest; on the answers to them depend the steps that must be taken to check the disease, and to stop the steady wastage it causes to the community.

In the first place, dysentery (I exclude specific tropical dysentery) is a decidedly communicable disease; a man suffering from dysentery is a danger to the other patients in the same ward or to other men in the same gang. The fact of communicability is admitted on all sides. It has been noticed in the repeated outbreaks of asylum dysentery in England, in the persistent dysentery of Indian jails, and in the dysentery of the South African Army.

Whenever a communicable disease of this nature exists the first article to fall under suspicion is the water supply. But all recent experience with dysentery, and to a certain extent with enteric fever, is against the purely water-borne theory of the disease. In Indian jails the water supply is most carefully guarded. It is boiled, filtered through Pasteur filters, and purified in every known way. Yet dysentery is generally more common in a jail with all its sanitary precautions than it is in the town in which the jail stands. At the Hughli Jail, and doubtless at many others, the jail water is known to be the best in the district; it is carefully filtered, and is sold to European and native residents at two pice a ghurrah. These consumers do not suffer from dysentery, but the prisoners drinking the same water suffer badly. In the South African Campaign it was repeatedly noticed that columns who were marching hard on the veldt, and drinking all kinds of water, remained in good health until they returned to standing camps, when dysentery and enteric soon broke out.[1] In other cases, men stationed in block-houses, who never touched water save as tea or coffee, were attacked by dysentery or by enteric. There is much evidence to show that soil pollution alone in many cases was solely responsible for the disease. The researches of Firth and Horrocks at the Cape, and of Aldridge in India, all tend in the same direction. Locally in the Andamans the same impression is given. Everywhere the convict's drinking water is boiled, and as far as possible he is made to use that water. Dysentery is most prevalent in the rainy (and cooler) months when the necessity for surreptitious drinking is not so great. Though there is not much dysentery on Ross Island, yet it is more frequent among the convicts who are provided with boiled water than among the European residents and troops (British and Native) who rarely make use of such water. More than this, we do not get explosive outbreaks of dysentery following the use or following the infection of a specific water supply, and which cease or diminish when that water supply is improved or dried up. On the other hand, we do get some outbreaks of acute diarrhœa, and these can usually be traced to a polluted water supply, incautious or improper feeding, or some similar local cause. These may be compared to the localised outbreaks of cholera which often occur in Bengal.

Institution dysentery, then, in India, appears to be due to a cause constantly present and active, having a slight seasonal rise and fall, and which is most potent when malarial fevers prevail or when climatic conditions favour chills and wettings.[2]

Conditions Chiefly Favouring the Spread of Dysentery.

(1) *Infection.*—Dysentery is undoubtedly a highly infectious disease, and a disease whose infective material retains its activity for a considerable period. To provide a special dysentery ward has long been the custom of Indian jails, and practical experience has demonstrated the value of this precaution. Since this practice has been in force in Port Blair, and the dysentery patients have been isolated, dysentery no longer develops in hospital, although it formerly did so to an appreciable extent. The infectious nature of dysentery has also been demonstrated in England by Dr. Mott, of the London County Asylums.[3] For many years dysentery has been the cause of much sickness and mortality in these institutions, and many inquiries have been held as to its cause. The conclusions of this report have been adopted by Commissioners in Lunacy and by the London County Council for use in their Asylums. The measures undertaken will be referred to later.

(2) *Soil Contamination as a Means of Spreading the Disease.*—The importance of this factor is being more generally recognised. The experiences of the South African War, above quoted, give much support to this theory. It was the insanitary standing camps, with their imperfect sewage removal and huge collection of refuse, that supplied the dysentery cases, not the hard work and exposure on the veldt. We know that the *B. typhosus* retains its vitality for long periods in the soils, and it is probable that its relation, the *B. dysenterica*, has the same power.

Soil infection in jails and institutions may occur in many ways. Deliberate fæcal fouling of the ground is hardly likely to occur, but accidental spillage of night soil or the emptying of urine tubs on the ground are not uncommon. The soiling of the ground with

[1] *Brit. Med. Journ.*, January 31st, 1903.

[2] *Vide* Chart showing malaria and dysentery with rainfall average.

[3] *Archives of Neurology*, London County Asylums, vol. 2, 1903.

waste food droppings is very common, and such soiled ground is bound to form an excellent nidus for bacilli. Flies abound in the neighbourhood of feeding places, and doubtless play their part in the carrying of infection. The native prisoner after his meal cleans his eating vessels with a handful of grass or earth picked up at random. This earth may or may not be clean. If taken from the vicinity of an old-established station it probably is not, and thus, too, infection may occur. The wooden floor of a sleeping barrack is easily soiled with dysenteric discharges, which may contaminate the clothes or persons of others, and so help to spread the disease. One or two men in an ordinary sleeping ward may thus be the centres of infection for the whole ward.

(3) *The Influence of Previous Attacks of Malaria and Dysentery.*—This is a most important point. Men who have suffered from much malaria are particularly susceptible to dysentery, and often the dysentery appears to be but a termination of a malarial cachexia. On analysing the 179 deaths from dysentery that occurred last year I find that each patient on an average had been five times previously admitted for malaria and twice previously for dysentery. Again, a large number of dysentery cases, both fatal and non-fatal, were admitted direct from the convalescent gang; many of these men, as far as we could discover, contracted their dysentery in the convalescent gang, being at the time weakened from malaria or other disease. Dysentery is such a chronic disease and so prone to relapse, that patients suffering from it have to be kept for long periods in the convalescent gangs, where, though they improve, they may at the same time infect others. But though the importance of malarial cachexia is great, it is not all important. Last year, of the 104 deaths among new arrivals, 47, or nearly one-half, were due to dysentery. These new arrivals, though probably they have all suffered from malaria, are by no means cachetic. Taking them all round, they are on arrival in good general health and condition, and their heavy death-rate from dysentery would appear to be due to some cause locally acting and locally acquired.

(4) *The Influence of Occupation on Dysentery.*—There are certain forms of convict labour and certain stations in the Settlement which appear to give rise to more dysentery than others, and where the dysentery is of a more fatal type. For example, of the 429 dysentery admissions into Bamboo Flat Hospital last year, 188 cases are reported from Goplakabang and 77 from Bajajag. The strengths of these stations are 900 and 400 respectively, in a population of 4,000. Again, the Viper Sub-Division, Namunaghar (strength 452) had 223 admissions with 13 deaths, Dundas Point (strength 623) had 178 admissions (18 deaths), and Viper (strength 812) gave 152 admissions, with 27 deaths.

Viper Hospital.		
786 dysentery cases.	86 deaths.	10·9 per cent.
Bamboo Flat Hospital.		
429 dysentery cases.	43 deaths.	10·0 per cent.
Haddo Hospital.		
452 dysentery cases.	24 deaths.	5·3 per cent.
Ross Hospital.		
298 dysentery cases.	13 deaths.	4·4 per cent.

At Bamboo Flat Hospital, out of 429 dysentery cases, firewood-cutting gave 47, forest work 55, general coolie work 101, and roads 49 admissions. Only 5 self-supporters were admitted. At Viper, out of 786 dysentery admissions, brick-making gave 93, firewood 57, road work 102, and earth-digging 88. There were 8 self-supporter admissions. It will be noticed that the occupations furnishing these dysentery admissions are all those entailing hard out-door labour. The men are in many cases working in the jungle, or at places far from efficient supervision. They are the occupations which entail most exposure and which give rise to most malaria. In these areas, too, the death-rates from dysentery are noticeably much higher than elsewhere. From these figures one cannot but think that exposure combined with malaria are at least powerful predisposing causes of dysentery, but at the same time, the remarkable freedom from this disease enjoyed by self-supporters (who are mainly agriculturists) should not be forgotten.

(5) *Malingering.*—The readiness with which dysenteric symptoms can be self-induced, and the difficulties that exist with regard to the detection of such cases, make the treatment of dysentery among a convict population a most involved question. The convict has on every side of him opportunities, which, discreetly made use of, will give him the clinical symptoms of dysentery. He sees that the dysentery patient spends a long easy time in hospital, that he draws extra and more palatable rations, that he is treated with every care, and has only, when in the convalescent gang, the very lightest work to do. Naturally, all this appears very enviable to the average labouring convict, and one cannot be surprised if he attempt to illicitly produce the disease. The means employed are simple and well known, especially to the older convicts, and usually comprise the eating of some irritating material. Though of course such an irritant will not produce specific dysentery, yet it will cause a serious relapse in a man previously troubled with the disease, who with care would remain well. But to get the best results in the treatment of dysentery, the disease must be attacked at the very earliest moment, and to check its spread the patient must be isolated immediately. Yet in doing so, we are bound to lay ourselves open to the most flagrant malingering and deception. Following out a well-known principle, it is necessary to catch the malinger before punishing him, and this is by no means always an easy task. A few punishments for malingering may keep down the numbers reporting sick, but they will also keep always from hospital the man in the early stages of the disease when he is most amenable to treatment, and when he should be removed from the chance of infecting others. Every plan that one can suggest for the prevention and treatment of dysentery must take this question of malingering into account.

The following are the principal irritants used locally with the object of producing dysentery. Croton and castor-oil seeds, croton leaves, cocoanut kernels, the bark, leaf or juice of the guluchmi (*Plumeria acuminata*), and the leaf or juice of the uk or madar (*Asclepias gigantea*). Jail prisoners use cocoanut husks, kernels

from which the oil has been expressed, surkhi, pounded brick or pounded plaster. Powdered glass is used at times. A favourite trick is to come to hospital for medicine after taking one of these irritants, so that the resulting dysenteric symptoms may be ascribed to the medicine given.

Other Causes Favouring the Spread of Dysentery.

Overcrowding promotes the spread of dysentery as of any other infectious disease. Where there is insufficient floor space the risks of direct infection from man to man are considerably increased, and the disease spreads more easily. This matter is discussed by Clouston[1] in connection with the outbreak of dysentery in the Edinburgh Lunatic Asylum.

Errors of Diet or Errors in Cooking.—These are well-known causes of intestinal trouble, and are within the experience of all. Buchanan is confident that he has traced the connection between certain badly cooked rations or weevil-eaten grain and exacerbations of dysentery in his jails; he further states that when minute attention has been once more paid to the cooking or to the grain supplies, the dysentery has diminished or ceased. Curiously enough, Sandwith, in a subsequent paper, stated that pellagra, a disease prevalent in Egypt and Italy, and caused by eating diseased maize, frequently terminated in dysentery.[2] The absolute carelessness and culpable ignorance of the convicts predispose them to bowel complaints of all kinds. The convict will not wear his blanket coat if he can possibly avoid it. He will eat anything that he ought not to eat, and the fact of its being indigestible or dangerous seems to add to its desirability.

Methods of Preventing Dysentery.

Any method that has already proved successful is specially worthy of notice. I have referred above to the outbreaks of dysentery in English Asylums, and to the fact that one method has been adopted by the London County Council and by the Commissioners in Lunacy.

(1) *A System of Notification of all Dysenteric and Diarrhœal Diseases* has been instituted, and this notification extends to the staff as well as to patients. "It is certain that the continuance of notification, with relief of overcrowding and its dependent sanitary defects, the treatment of the cases like typhoid with constant and minute attention to recognised modes of isolation on the part of the staff, attendants and nurses, in asylums where dysentery exists, will much abate the disease; and when cases do arise, either within the asylum or from transfers or admissions, the spread of the disease will thereby be arrested. Moreover, since the system of notification has been in practice, and attention thereby continually called to the disease, the number of cases reported from all the asylums has considerably diminished."[3]

Now, this may be practicable in a large London Asylum, but it is not easy to carry it out in a convict Settlement. It might be practicable to notify the barracks from which dysentery cases are admitted, but this would be the most that could be done. In most jails what is known as a night latrine register is kept; the jailer in his morning report shows the number of men that have used the night latrine during the past night. This gives one a valuable index as to the health of the jail, for any sudden rise in these numbers means a corresponding rise in the bowel complaints. But to use this with any value implies that latrine parades are strictly enforced, and that the convicts are given a reasonable opportunity of using the day latrine before being locked up for the night. The night latrine, if largely used, becomes a nuisance, and a possible centre of infection for the occupants of the barrack to which it is attached. More than this, if everyone, or nearly everyone, uses the night latrine it becomes impossible to pick out the early cases of bowel disease from amongst the crowd of others. In the Presidency Jail, Calcutta, with a population of 1,200, the usual number of men using the night latrines was 45 to 60.

Another precaution that I introduced into this jail and found extremely useful, was to see personally every man that used the latrine out of hours. In this way all early cases of looseness were investigated at once and put under treatment, whilst the amount of time saved by discouraging men on important work from running out to the latrine was very considerable. This procedure is not capable of general application here, but possibly something of the sort might be introduced in selected areas.

(2) *The Adoption of Separate Dysentery Wards with Special Latrines and Disinfecting Apparatus.*—This method is already in use, and is of considerable value. At each hospital dysentery cases are treated in a separate ward, and in every way as infectious cases. But I do not think we carry this far enough. I think dysentery cases should have a special convalescent gang, separately housed and fed, not so much for their own sakes as for that of the community. Many of our dysentery cases, even of the fatal ones, contract their disease in the convalescent gang; that is to say, they have been in hospital for another complaint, probably malaria, and then, when discharged to the convalescent gang, are infected with dysentery there. But here, as elsewhere, the malingerer is our great obstacle. To the average convict, and especially to the one of indifferent character, the advantages to be gained by an attack of dysentery are so great as to offer many inducements to malinger.

Colonel Crawford, of Hughli, proposes to treat all dysentery cases in separate confinement, and thus to discourage sickness.[4] I am not at all sure whether it would not be profitable to use one block of the Cellular Jail purely as a dysentery hospital; cases so treated would be under the closest observation, and would have little or no opportunity of starting the disease afresh as their time for discharge approached. It may be questioned whether the amount of dysentery is sufficiently great to justify such a step, but dysentery

[1] Clouston, "Report of Morningside Asylum, 1902."
[2] "Section of Tropical Medicine," B.M.A., August, 1902.
[3] *Archives of Neurology.* Claybury. Vol. 2.
[4] Hughli, *Medical Gazetteer*, 1902.

is the most fatal disease here. Last year it killed 179 people, and of these, 139 were of five years' service and under, and 101 under two years. Besides this, there are over 2,000 admissions to hospital. Now each dysentery case is non-effective for at least six weeks—a fortnight in hospital and a month in the convalescent gang, so that the sum total of wasted labour must be enormous.

(3) *The Taking of Minute Precautions with Regard to Food and Cookery.*—These are of distinct importance. The provision of a hot, well-cooked meal after a hard day's work is of the greatest benefit, and in most stations in the Settlement such a meal is provided. I think efforts should be made to provide *pucca* feeding platforms at every large station, on a plan something similar to that adopted for Ross. These, if made sufficiently well to stand washing and sweeping, could be kept thoroughly clean, flies would not be attracted, nor the ground be soiled.

(4) *The Avoidance of Chills and Sudden Wettings*, the provision of dry clothes, and precautions of this nature are everywhere recognised as of the greatest importance, though under local conditions they are not easy to attain. With this object Major Anderson introduced the Chittagong leaf hat, but it was found too cumbrous for daily use. Another experiment is now being made with a locally waterproofed coat, and this, if successful, should be a great boon. Drying rooms for the convicts' clothes have been already advocated, and are likely to do much good.

The Treatment of Dysentery.

The two great maxims are promptness and rest. Many, perhaps most, cases of dysentery taken early, put to bed and given suitable food, with a dose of castor-oil, will recover fairly rapidly. But cases that have hung on for two or three days, eating unsuitable food and attempting to work, are much more difficult to manage. In the South African War, salines were found to be of more use than ipecacuanha, and this is also Major Buchanan's view. Locally we find there is very little difference between the two treatments, but the general preference is in favour of ipecacuanha as to the most useful drug. Investigations have been made in the various hospitals with ipecacuanha, sodium, sulphate and magnesium sulphate, and dysentery cases were treated with these three drugs in rotation, *i.e.*, the first case was given ipecacuanha, the second magnesium sulphate, and so on. The time of appearance of bile, or of a change in the character of the stools, from mucous to fæcal, was taken as an index.

The figures are :—

Treatment	Cases treated	Time required for stools to change	Cured	Deaths
Ross Hospital.				
Ipecac.	63	2·9 days	62	1
Magnesii sulphas ..	71	2·7 ,,	69	2
Sodii sulphas ..	86	2·6 ,,	84	2
Sulphur, Bael, &c. ..	51	5·4 ,,	48	3
Bamboo Flat Hospital.				
Ipecac.	253	3·00 days	229	24
Magnesii sulphas ..	20	2·30 ,,	19	1
Sodii sulphas ..	43	3·02 ,,	40	3
Viper Hospital.				
Ipecac.	345	2·3 days	310	35
Magnesii sulphas ..	134	2·8 ,,	108	16
Sodii sulphas ..	91	2·5 ,,	78	13
Haddo Hospital.				
Ipecac.	113	2·5 days	107	6
Magnesii sulphas ..	115	2·6 ,,	105	10
Sodii sulphas ..	106	2·6 ,,	98	8

Thus, in over 1,500 cases of dysentery, the results from these three drugs, both as to mortality and as to duration of the acute symptoms, are practically the same. Sulphur has been recommended in the treatment of this disease, especially in the West Indies. It has not proved successful here. An attempt was made to grow *Brucia sedativa*; some seeds were obtained from the Royal Botanic Garden, Singapore, but they did not germinate.

The usual auxiliary methods of treatment were also freely used. They are too well known to require description; but the principal ones are Bael, kurchi bark (*Holorrhua antidysenterica*) and Yussuf gôl, whilst "Mathu," a preparation of dâhi, is an excellent diet. Rectal injections are of service amongst Europeans, but natives object to them so strongly that it is hardly practicable to employ them. In the treatment of convalescents from dysentery the greatest care must be taken of their food, and the quality of the milk supply is of the first importance.

The use of the blanket cholera belt by patients and convalescents is of much importance, but it is a matter of extreme difficulty to ensure that it is regularly worn.

Differential Blood Counts in Dysentery.

I attach as an appendix to this report an analysis of 150 differential leucocyte counts in dysentery.[1] The importance of differential counting in many diseases has of late received much attention, and its value has been conclusively demonstrated in many obscure malarial cases.

The nomenclature adopted is that of *Da Costa*;[2] Grübler's eosin and methylene blue have been exclusively used for staining, following previous fixation in absolute alcohol.

The most marked feature of the disease is the number of small lymphocytes; 30, or even 35, per cent. of this variety are found; but the increase is by no means so marked as is that of the large mononuclears in malaria.

Da Costa gives the following analysis of the white cells in his treatise[3] :—

Small lymphocytes	20 to 30 per cent.
Large lymphocytes	4 to 8 ,,
Polynuclear neutrophiles ..	60 to 75 ,,
Eosinophiles	·5 to 5 ,,

French, in his paper in the *Practitioner*, gives the following table[4] :—

Small lymphocytes	25 per cent.
Large lymphocytes	8 ,,
Polynuclear neutrophiles	65 ,,
Eosinophiles	2 ,,

[1] One hundred and fifty cases.
[2] *Clinical Hæmatology*, Da Costa, 1902.
[3] *Loc. cit.*, p. 159.
[4] *Practitioner*, March, 1903.

Rogers states that in bacterial dysentery the differential leucocyte counts show nothing of interest.[1] This is hardly correct. My results show that there is no marked leucocytosis, but that the neutrophiles are generally diminished in number. The small lymphocytes, as above stated, tend to increase, and are frequently above 30 per cent. of the total. It is interesting to observe how the presence of malaria may effect the count, by sending up the number of large mononuclears.[2]

The presence or absence of intestinal parasites may have also an effect on the count.[3] In some cases, *Dochmius duodenalis* were found. They usually caused some eosinophilia, but this is not constant.

In short, institution dysentery may be said to cause a general increase in the small lymphocytes, which increase may be modified by the presence of malarial parasites or of intestinal worms.

THE EFFECT OF DRAINAGE AND OTHER MEASURES ON THE MALARIA OF KLANG, FEDERATED MALAY STATES.

By Malcolm Watson, M.B., C.M.Glas., D.P.H.Cambs.
District Surgeon, Klang, Federated Malay States.

(*Continued from page* 353.)

The actual amount of money spent at Port Swettenham has been as follows (dollars are Mexican):—

By Railway Dept., on filling in according to scheme		10,000 dols.
By P. L. Dept.	Filling in swamps	15,730 ,,
	Drainage	4,800 ,,
	Bunding—including tide gates ..	6,400 ,,
	Felling jungles	1,620 ,,
	Contingencies	1,450 ,,
	Total ..	40,000 ,,

It need hardly be pointed out that besides making the town healthy, these works have reclaimed over 100 acres of land, most of which is worth a considerable sum of money. Nothing could have been made of most of this land until it was bunded and drained, as it was covered by all high-tides, consequently the work has had a double value.

Results Obtained.

Having set forth at some length the amount of malaria in Klang and Port Swettenham during 1901, the local conditions favouring its spread, and the public works undertaken for its reduction, and, if possible, extermination, it now remains to show what success had attended these efforts, and if possible to estimate the benefit to the community.

In an experiment like this it is desirable to have a control, where the conditions will remain the same for the period under consideration. This, I think, is supplied by the population of the district outside of the towns of Klang and Port Swettenham where no special works were done.

The population of the towns of Klang and Port Swettenham is now about 4,000, and of the rest of the district about 14,000. The district is almost entirely agricultural, many of the estates being of large size, while there are also a large number of small native holdings scattered along the roads. The conditions in the district are, therefore, not such as could be easily altered, and it forms, I think, an excellent control for the experiments carried out in the two towns.

During the two years there has been no event of importance beyond the opening of Port Swettenham, and this was practically only the removal of a portion of the population of Klang to another place five miles away. The population has probably increased at its usual rate. There has been no importation of coolies for any special work. The work at the waterworks, eight miles from the town of Klang, was completed at the very end of 1902, but this did not affect the conditions of the experiment, unless it did so by showing fewer cases of malaria from the district. So far as I am aware, the conditions were identical throughout the two years, except for the rainfall and the drainage done at Klang and Port Swettenham. The rainfall was greater during 1902 than in 1901.

The feature of the year 1902 from a health point of view has been the reduction of the number of cases on malaria treated at the hospital from 1,772 in 1901 to 767 in 1902, a reduction of 1,005 cases, or 56 per cent.

The reduction occurred both in the admissions to the wards and the number treated as out-patients, the former decreasing by 404, from 807 to 403, and the latter by 601, from 965 to 364. This fall in the number treated is the more significant when it is seen that with the single exception of the year 1897 the number treated has steadily risen since 1894.

	1894	1895	1896	1897	1898	1899	1900	1901	1902
No. of malarial cases treated at hospital ..	263	591	888	682	857	919	1,204	1,772	767
Deaths for the whole 40 districts	205	342	511	466	475	538	780	998	551

Another striking fact emerges when an analysis of the residences of malarial cases admitted to the wards is made. The residence in each case was carefully noted, and the analysis shows that the number of cases admitted from Klang and Port Swettenham decreased 67·36 per cent., while the cases admitted from elsewhere increased 3·53 per cent., as will be seen from the following table:—

Residence	Year 1901	Year 1902	Difference	Increase	Decrease on 1901
Klang and Port Swettenham	610	199	411	—	67·36
Elsewhere ..	197	204	7	3·55	—
	807	403		—	—

[1] "Notes on the Bacteriology of Dysentery," *Indian Med. Gaz.*, February, 1903.

[2] Delaney, *Brit. Med. Journ.*, March 28th, 1903.

[3] Baker, *Brit. Med. Journ.*, March 28th, 1903.

The indoor cases form so considerable a percentage of the total number treated, and the curves of indoor and outdoor numbers have run so nearly parallel, that I think it is not assuming too much to say that the great reduction in malaria has been in cases admitted from Klang and Port Swettenham, while there has been practically no change in the numbers coming from the rest of the district.

(*A*) From the following table it will be seen that during the whole of 1902 the percentage of the malarial cases, of the total number of cases treated at the hospital, kept coming down, and in December had reached a point never before touched in the ten years' record. Since then the percentage has, on two occasions, reached a still lower point, and during 1903 it has generally been at a lower level than hitherto, and very much below 1901.

PERCENTAGE OF MALARIA.

	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903
January..	—	13·3	21·3	26·6	15·7	20·4	19·3	23·2	28·0	39·6	14·1
February.	—	14·1	20·0	28·4	14·0	17·3	14·0	19·5	25·8	28·2	8·1
March ..	—	13·8	20·6	22·8	21·0	18·7	21·8	15·3	26·5	21·6	12·2
April ..	11·3	17·2	26·0	28·0	15·1	21·3	22·9	14·7	30·3	15·8	9·2
May ..	21·5	18·8	28·1	23·4	13·9	21·9	17·8	17·4	39·7	20·3	12·3
June ..	21·2	24·7	36·3	24·5	15·6	17·0	21·4	16·1	32·3	21·6	10·7
July ..	16·9	31·4	29·3	27·2	19·8	23·8	16·5	26·6	32·4	19·5	—
August ..	24·7	20·0	23·8	26·2	19 5	19·3	18·7	23·9	22·7	14·4	—
September	21·1	24·3	35·2	24·5	25·0	25·7	16·0	28·8	29·8	18·5	—
October..	35·4	27·8	33·8	19·2	23·2	32·9	24·0	31·5	51·0	15·6	—
November	15·7	14·6	34·4	24·6	25·8	33·6	20·7	37·8	65·0	15·5	—
December	16·4	23·5	22·8	25·6	25·0	26·4	25·1	32·1	52·9	10·9	—
Total ..	20·6	20·4	28·9	25·0	19·7	23·5	20·2	24·9	38·8	20·4	—

This sudden decrease in the amount of malaria, as a result of draining comparatively small areas, is in striking contrast to the gradual decrease the result of the draining of Kuala Selangor district. In that district the population is scattered along the coast for many miles. The road runs parallel to the coast about a mile inland, and when first constructed acted, according to the official reports of the District Officers, as a dam, preventing the land from being drained.

TABLE SHOWING THE PERCENTAGE OF MALARIA TREATED AT THE HOSPITALS IN THE DISTRICT OF KUALA SELANGOR.

Year	1895	1896	1897	1898	1899	1900	1901	1902
Percentage	23·7	25·9	28·3	40·1	59·0	48·7	31·5	23·0

In 1898 a start with extensive drainage works was made. The first result of the introduction of the labour force was further to increase the amount of malaria. The work has, however, been steadily pushed on, and the result has been a gradual fall in the amount of malaria as the drainage works became effective. This, I think, forms an interesting contrast to the results obtained in Klang and Port Swettenham.

So far the combined results of the operations in Klang and Port Swettenham have been given, as to a considerable extent it has not been possible to obtain separate statistics. But in the case of the admissions to hospital it is possible to show the results, as is done in the following table. In the table the residence of a certain number of cases is marked uncertain. These lived in Klang and worked at Port Swettenham.

	1901				1902			1903		
	Klang	Uncertain	Port Swettenham	Elsewhere	Klang	Port Swettenham	Elsewhere	Klang	Port Swettenham	Elsewhere
Jan.	24	—	3	8	32	18	24	6	5	15
Feb.	17	—	0	9	17	10	18	3	0	4
Mar.	27	—	3	7	19	2	15	8	2	11
April	33	—	4	10	7	6	13	1	1	7
May	31	—	0	14	10	8	15	5	3	13
June	36	—	5	19	10	1	13	2	2	16
July	26	—	9	16	9	3	19	—		—
Aug.	13	—	15	15	5	4	20	—		—
Sept.	11	—	13	17	9	9	17	—		—
Oct.	24	31	34	28	8	3	17	—	—	—
Nov.	56	39	79	33	2	3	20	—		—
Dec.	36	18	23	21	1	3	13	—		—
Total	334	88	188	197	129	70	204	—	—	—

Some have said that the epidemic at Klang was the result of the disease being imported from Port Swettenham. This was not so, as is shown by the fact that the increase of malaria for the first half of 1901 had been 69 per cent., and this I had reported officially nearly three months before the port was opened.

Turning to the number of deaths from malaria which occurred in the hospital, the following table will show, as might be expected, a corresponding reduction.

Residence	1901	1902	Increase	Decrease
Klang and Port Swettenham	52	9	—	43
Elsewhere	19	23	4	—

But to these should be added seven other deaths from malarial coma. These were persons who died within half-an-hour after admission, before anything could be done for them. According to the custom, if the dresser on duty had not time to fill in a case-sheet the case did not appear in the returns, although notified to the Registrar. From May, 1901, all deaths which occurred within the hospital wards have been recorded in the returns. It will therefore be seen that fifty fever deaths have occurred among malarial cases admitted from Klang and Port Swettenham.

Deaths for the whole District.—With a population rapidly increasing, one naturally expects to find a corresponding increase in the number of deaths. But since 1899 the rate of increase has been out of proportion to the increase in the population. The actual numbers are shown in the following table.

Year	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902
No. of Deaths	140	206	342	511	466	475	558	870	998	547

It will thus be seen that not only has the rise been unnaturally great in the years 1900 and 1901, but that there has been a striking fall in the numbers registered in 1902.

A study of these statistics will show that the cases of malaria treated and the number of deaths recorded progress along well nigh parallel lines. On these grounds I am inclined to consider that the amount of malaria in the hospital gives a fair indication of the health of the district, and of the amount of malaria prevailing, and also that malaria has hitherto been one of the chief causes of death, certainly within the last three years.

But if this great fall in 1902 in the number of deaths has been due to the diminution in the amount of malaria, it should be found to be an improvement in the two towns only, and not in the rest of the district; and this is exactly what we find, as is seen in the following table, compiled from the death register, and corrected for deaths occurring in the hospital.

TABLE SHOWING THE PLACES OF DEATH.

Residence	1901	1902	Increase	Decrease
Klang and Port Swettenham ..	582	144	—	438
Elsewhere ..	416	403	—	13
Total	998	547	—	451

We find, therefore, that in the two places in which anti-malarial measures were taken the amount of malaria treated at the hospital and the number of deaths registered—both of which had hitherto been greatly out of proportion to the population of the places—simultaneously fell; while the amount of malaria and number of deaths remained practically the same for the district. These facts would appear to point to a saving of no less than 481 lives in the year 1901 as a direct result of the work done.

There is, however, a factor which seems to indicate that the saving of life has perhaps not been quite so great. So far, I have said nothing of the other diseases admitted to hospital. The number of these decreased by nine in 1901. The following table shows this.

OTHER DISEASES TREATED AT HOSPITAL.

Residence			1901	1902	Increase	Decrease
Indoor patients	Admissions	Klang and Port Swettenham..	549	446	–	103
		Elsewhere	413	507	94	—
	Deaths	Klang and Port Swettenham..	94	46	—	46
		Elsewhere	67	73	6	—
Outdoor patients, total ..			1,824	2,025	201	—

It is, therefore seen that in the two towns other diseases have diminished to a considerable extent, as well as malaria; but the fall occurred mainly in the beginning of 1901, before the sanitary works were undertaken. Of the diseases which show a decrease, debility accounts for 11, anæmia for 15, diarrhœa for 39, dysentery for 16. The first three are frequent sequelæ of malaria, and in certain cases of clinically acute dysentery. I have found malarial parasites, and succeeded in curing with quinine, after failing with the ordinary anti-dysenteric treatment. It would, therefore, not have been unexpected had these diseases diminished with the fall in malaria; but I would also have expected some increase of these cases further back than 1901. From the impossibility of carrying an analysis of these cases further back than 1901, it seems to me that it is difficult to realise the true meaning of the variation.

To see if any light could be thrown on this, an analysis of the causes of death registered was made. The cause of death in the great majority of cases is not certified by qualified medical men; but as little typhoid fever exists here (less than six cases in the hospital in two years, and the blood of practically every febrile case is examined by me personally), one great source of error in fever statistics is absent. As will be seen from the subjoined table, the greatest improvement has been in the number of deaths from fever in Klang and Port Swettenham. There will also be seen a considerable improvement in other diseases, including convulsions in children, so often malarial.

For the rest of the district, fewer deaths from fever have been recorded; but the decrease is much less than in Klang and Port Swettenham. The number of deaths from other diseases has increased in the rest of the district.

TABLE SHOWING THE RESIDENCES AND SOME OF THE CAUSES OF DEATHS REGISTERED IN THE DISTRICT. CORRECTED FOR DEATHS OCCURRING IN HOSPITAL.

	Residence	1901	1902	Increase	Decrease
Fever.. ..	Klang and Port Swettenham	368	59	—	309
	Elsewhere ..	266	227	—	39
Convulsions in children ..	Klang and Port Swettenham	38	10	—	28
	Elsewhere ..	40	22	—	18
Other diseases	Klang and Port Swettenham	176	75	—	101
	Elsewhere ..	110	154	44	—

The reduction in the number of deaths from "other diseases" was synchronous with the fall in the number of deaths from malaria, and the suggestion of an improvement in health prior to the improvement in malaria, hinted at by the admissions for other diseases, is not borne out. Even allowing that the registered cause of death was correct in every case, the fall in the number of deaths from other diseases was probably influenced by the decrease in malaria. But exactly how far the reduction in the number of deaths from other diseases in Klang and Port Swettenham is the result of drainage is difficult to say. Personally, I believe it has been partly due to an improvement in the public health from the decrease of malaria. When, as in 1901, few people escaped

From a Photograph by Barrauds, Liverpool.

SIR ALFRED LEWIS JONES, K.C.M.G.,

Chairman of the Liverpool School of Tropical Medicine.

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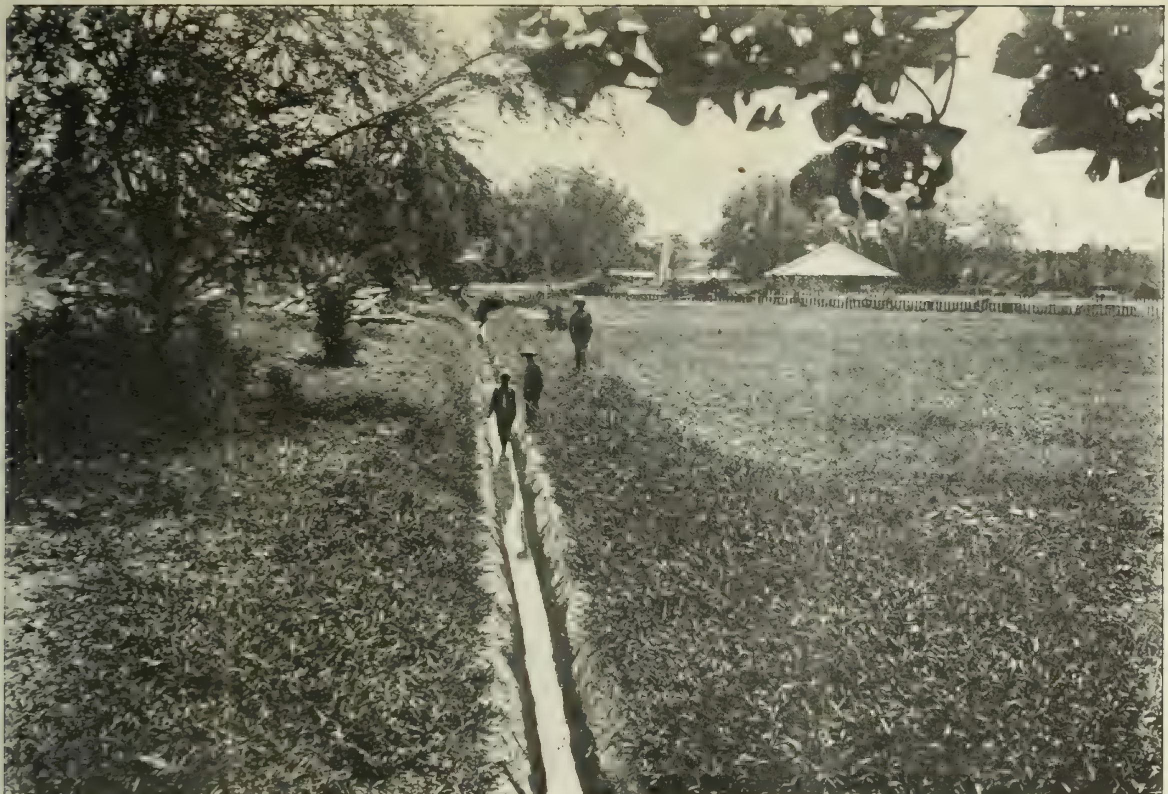

A MAIN DRAIN AT KLANG WITH CONCRETE INVERT AND TURF TOP SIDES.

A TIDAL VALVE IN BUND B. AT PORT SWETTENHAM.

Photographs illustrating the article on "The Effect of Drainage and Other Measures on the Malaria of Klang, Federated Malay States." By MALCOLM WATSON, M.B., C.M.Glas., D.P.H.Cambs., *District Surgeon, Klang, Federated Malay States.*

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malaria, many must have been so weakened as to fall victims to infectious diseases, such as diarrhœa, dysentery; and much as our winter fogs tell on the old at home, so, too, many of the old people here died from malaria, and were registered as having died from old age.

These, broadly, are the results obtained directly and indirectly, but before closing I may be allowed to point out also the direct again to the Government Service. In 1901 I gave to Klang officers who were suffering from malaria 216 certificates, representing 842 days' sick leave; and in 1902, 46 certificates, representing 162 days' leave. For the same periods the District Surgeon of the General Hospital, Kuala Lumpur, gave to Klang officers who were admitted to that hospital with malaria on my recommendaton 42 and 11 certificates, representing 296 and 77 days respectively. In other words, there was a saving of 899 days in 1902 as a direct result of the reduction in malaria.

Another way in which the improvement is shown is in the number of attacks of fever experienced by the Government servants and their families stationed at Port Swettenham. The number of these has now increased to 216.

From September 15th, 1901 (the date of opening the port), to the end of that year, there were 188 attacks of fever, while in 1902 for the same period there were only 22 attacks.

The results of the measures taken to obtain early information of sickness among the Government servants at Port Swettenham have been very gratifying. The only two deaths from malaria which occurred among Government population during the two years were those of two persons who refused European treatment. The great majority of Government officers suffered from the malignant parasite, and my death-rate for malignant malaria in 1901 in the hospital (including all cases admitted) was 19·8 per cent.

From what I can ascertain, the number of deaths from malaria among those connected with Port Swettenham during the three and a half months after it was opened amounted to no less than 70.

Under these circumstances I think the measures taken with regard to Government servants, although perhaps at times rather autocratic, have been attended with very gratifying results.

In conclusion, experiments on a considerable scale have been carried out in two places, and in each of these there has been a great reduction in the amount of malaria; while in the control area no fall has taken place to anything like a similar degree. Nevertheless, I think there are indications that the whole district is benefiting by the abolition of two hotbeds of the disease. In all probability, people coming into Klang and Port Swettenham, either by sea or from the district, contracted the disease, carried it away, and spread it.

This is not the place to enter into a discussion of many interesting points which have emerged from a study of the epidemic; but perhaps the prevalence instead of, as formerly (in 1901), rarity of the quartan parasite is worthy of note.

Time alone will show how far the conclusions I have reached are justified. It may be that some unexpected condition has been the cause of the improvement. If so, it is an extraordinary coincidence that this condition should have operated on two places, physically very different, five miles apart, notoriously the most malarious spots in the district, in the very year in which in the two places anti-malarial works were undertaken, and, further, have operated on these two places to the exclusion of the rest of the district.

I think, however, that so far from this being merely a coincidence, the evidence is strongly in favour of the improvement being the result of the drainage and abolition of swamps within the town areas.

The results are, I think, of a most striking nature, and form a pleasing contrast to what might have been expected, had 1902 been as much worse proportionately as 1901 had been to its predecessor. And such a thing has happened in the other two districts of the Selangor coast, where the 38·8 per cent. of malaria of Klang in 1901 has been far exceeded.

It is not the knowledge of what might have been, but what is, which induces me to record these experiments, in the hope that they may be an encouragement to others who have to combat the disease. To the many workers who have contributed in bringing about this result there must be joy at the saving of so many lives and so much untold misery.

SOME OBSERVATIONS ON TINEA IMBRICATA, YAWS, AND THE TREATMENT OF DYSENTERY.[1]

By Raoul de Boissière.

Provincial Medical Officer, Bua, Fiji.

(1) Knowing the interest which you take in all tropical troubles, I venture to bring some of my observations on "tinea imbricata" to your notice. In the description of this disease, it is stated on p. 696 of your book on "Tropical Diseases," that "Dr. Oswald Baker, confirmed by Triburdean, remarks that it avoids the crutch, the axillæ, and the nails." Since my arrival here I have seen some hundreds of cases of the disease, as it is extremely common in my province. The result of my observations, carefully made, do not agree with the above statement. I will just quote the result of my first 100 cases, as it may be of interest to you. The cases were all very extensively attacked, and had been of at least one year's duration. Of this 100 cases, 70 had the crutch affected as part of the general affection, 60 showed well-marked disease of the axillæ, and none showed any infection of the nails. These results have since been fully confirmed by a second series of 100 cases, the results of this latter being: crutch, 75; axillæ, 66; nails, 0. As there yet remain some hundreds of cases not yet specially examined, if you care to have further details I shall be happy to supply them. As the cases already examined were all very extensively affected and very

[1] (This communication was addressed to Sir Patrick Manson, K.C.M.G., in the form of a letter.)

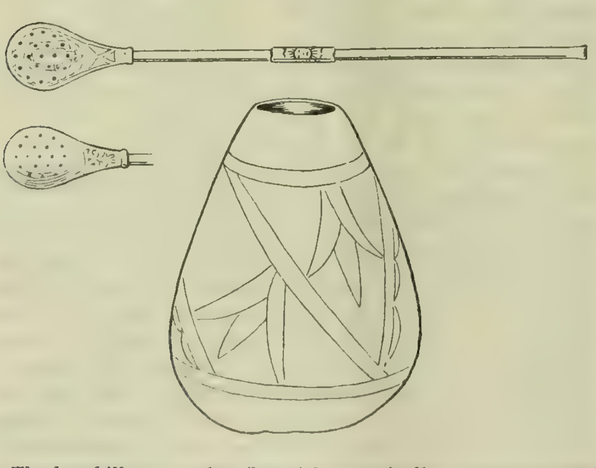
typical, I do not think that you need suspect me of a wrong diagnosis.

(2) The people of this province seem saturated with the poison of yaws. The tertiary manifestations of the disease are extremely common, and apparently indistinguishable from those of syphilis. No one who has lived in a district like mine can doubt that these are genuine sequelæ of yaws. I am the only European here; syphilis is unknown, and these sequelæ so common, that the opportunities for observation are almost unlimited. I feel sure that 99 per cent. of English medical men, at the very least, would undoubtedly diagnose these cases as being those of tertiary syphilis, supposing these gentlemen to be ignorant of the fact that syphilis does not exist here.

(3) I would next like to offer you my humble confirmation of the really valuable drug we possess in "ipecacuanha" for the treatment of dysentery, acute and chronic. This disease is also very common in my province, and I have never known the drug fail me in any genuine case of dysentery. In some of the very acute cases it has acted like "a charm," one or two doses (gr. 20) bringing about a speedy return to the normal. The Fijians take the drug quite well in the form of a powder; provided the drug be given when fasting, and the patient continue so for another two hours after taking it, no other precautions are necessary in their case to prevent nausea.

YERBA-MATÉ.

In the issue of October 1st, 1903, we published an interesting article on yerba-maté by John William Lindsay, M.B., Ch.B., of Belén, Paraguay. Through the courtesy of the Rev. John Williams, of Oswestry, North Wales, we have been permitted to give an illustration of the maté pot and the apparatus (the bombilla) by which the decoction (tea) is imbibed.



The bombilla or sucker (brass) is practically a spoon covered in, the top and bottom surface of its bowl forming a strainer; the stem is hollow. The maté pot is a gourd holding a large breakfast cup or so.

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THE

Journal of Tropical Medicine

DECEMBER 1, 1903.

INSTRUCTION IN THE DISEASES OF ANIMALS.

THE Schools of Tropical Medicine in London and Liverpool are setting an example in several directions which might well be followed by older schools of medicine. When a new disease, or when an outbreak of some little known disease, occurs in any part of the world, they send, or they are the means of getting sent, medical experts to enquire on the spot into the etiology, the pathology and the prophylaxis of the ailment. We are not aware that any one of the medical schools in Britain other than those of tropical medicine undertake the investigation of disease in this practical manner, and why the old-established schools and wealthy universities of our country should not do so it is difficult to understand. The advance of medical knowledge is as much a part of the duty of one medical school as of another, yet the prosecution of studies on

the spot is left to the newly-formed schools of tropical medicine. No doubt the medical school in the ordinary acceptation of the term is a mere school—a seminary for the teaching of youth—and behind that idea our universities and medical schools would seem to shelter themselves. We are glad to say that the men connected with the most recently formed centres of medical education have taken a wider view of their duties and of the scientific aspect of their profession. When an ill-understood disease crops up, or when a new theory requires elucidation, the members of the staffs of the London and Liverpool Tropical Schools immediately seek to gather information at the source. They are not hampered by the conservatism which hedges more ancient establishments, but seek to obtain money, and are ready to produce trained experts to investigate on scientific lines what is new, uncertain, or unknown in regard to the disease.

Quite recently these progressive schools of study have inaugurated a feature in medical education which will continue to develope as time goes on. The incorporation of tuition in the diseases of animals which have a bearing on human ailments is a step in the right direction. The field is a wide one, and the importance of the subject incontestible. Day by day we come to know that what are termed human ailments are not confined to man; that the animals of his environment are subject to, or actually suffer contemporaneously from, similar or allied forms of the same disease. We have to go no further than plague to know how true this is. Animal forms of malaria occur in sheep, goats, horses, asses, &c. Trypanosomiasis is an affection of both men and animals. Malignant diseases are common to both; several of the intestinal parasites find their host now in man, now in animals. Trichina, hydatids, tuberculosis, and so forth, help to extend the list, and it may be we are but on the threshold of discovering the relationship of each towards such common ailments as rheumatism and many of the specific fevers. It is high time, therefore, that the borderland between the "Doctors" of men and of animals was crossed and that the two should work together side by side in the same classrooms and in the same laboratories. Disease is disease, be it in plants, in animals, or in human beings; and the wider our knowledge of all of these branches of divergence from health, so shall we be better able to understand and to focus our knowledge on any particular complaint of man.

SIR ALFRED LEWIS JONES, K.C.M.G.

THE portrait we issue with this number of the Journal is that of a man who has done good service to his country. His stimulating influence, his unbounded energy and never flagging zeal, in commercial, in municipal and in Imperial matters, are well known wherever the British flag flies. It is more particularly, however, with what he has done for tropical medicine that we are concerned. To Sir Alfred Jones the Liverpool School of Tropical Medicine owes its existence; and the benefits to science and to the people dwelling in tropical countries, both Europeans and Natives, as the result of the work done by his liberality and initiation, are incalculable. It is difficult to speak in moderate language about the work and the career of this remarkable man. Earnest in his every endeavour, patriotic in his motives, he possesses in addition a wideness of views, of liberality, of practical philanthropy, which in these later days are but too seldom met with.

Sir Alfred Jones was born at Carmarthen in 1845, and received his education at the Liverpool College. His very first appointment to the firm of Messrs. Laird Fletcher and Co. brought him into touch with the West Coast of Africa, and throughout his life he has remained a firm upholder of the possibilities of that region of the British dominions. In 1879 Sir Alfred became a partner in the well known firm of Messrs. Elder, Dempster and Co., and subsequently manager of all its business concerns. In West Africa he has encouraged the development of railways and of the increase of the production of this fertile district. Cotton growing in West Africa and in the West Indies has been the keynote of his advocacy in this direction, but other industries, such as the cultivation of the rubber vine, of cocoa, cocoanut and cobra, he has fostered and developed.

Sir Alfred Jones regards the problem of how to maintain the health not only of the European, but also of the native, in tropical climates as one of the most urgent and pressing of Imperial duties. Not only does the commercial side of the question engage his earnest endeavour, but the welfare of our brethren and of our fellow subjects in all the more trying climates of the Empire enlists his kindly sympathy. As he himself puts it, "This is no joke we are considering; the problem of how to render our colonies healthy strikes at the very core of the Empire's existence." Whilst such men are spared to us we have no fear for the welfare of our Empire, and we can regard the future with complacency.

Translation.

THE TRYPANOSOMES IN HUMAN AND ANIMAL PATHOLOGY, WITH A DISCUSSION OF THE LITERATURE ON THE SUBJECT.

(*From the Centralblatt für Bakteriology*, Ed. xxxiv., No. 8.)

By Lydia Rabinowitsch and W. Kempner.

Translated by Eugenie Joachim (Mrs. Frank Gibson) and Kenneth W. Goadby, D.P.H.Camb.

Researches concerning the animal diseases of hot countries caused by trypanosomes have made great advances in the etiology of the diseases during the last decade, but only slight progress in prophylaxis and treatment.

Lingard has published minute reports concerning surra, which attacks cattle, horses, mules, dogs, camels, buffalo, and other animals in India. Lingard's work has been followed up by Rogers, of India, Penning, Vrijburg, de Deos, from the Dutch Indies, and by Carougeau, of Indo-China.

Surra has recently been observed in the Philippines and in the Island of Mauritius.

The knowledge that the same animal species are attacked and sicken with the same clinical picture in both surra and nagana, or tsetse-fly disease, we owe in the first place to Bruce, who has studied the same in Zululand and gives a complete picture of the etiology and pathology of the disease.

Somewhat later, attention was again drawn to the animal diseases caused by trypanosomes by the minute researches of R. Koch in East Africa, which were especially directed to the suppression of the tsetse-fly disease. Schilling and Ziemann have studied this disease in West Africa and are continuing their work there.

As a third disease (besides surra and nagana) caused by the trypanosomes should be mentioned dourine, or "rutting" disease of the horse in Algiers. Schneider and Buffard ascribe this disease to the trypanosome already described by Chauvrat and Rouget.

A further pathogenic trypanosome has been described recently in the horse in the disease known for many years as mal de caderas in Paraguay (Elmassian). Further researches by Abala, Voges, and others, and above all by Lignieres in the Argentine, have confirmed the origin of the mal de caderas. Another pathogenic trypanosome was described by Theiler last year as being found in cattle in the Transvaal which certainly is not the same as the above-mentioned trypanosome species.

But it is not only in the countries where these diseases have their habitat (Asia, Africa, America) that trypanosomiasis has been studied, but also in recent years in Europe by Nocard, Laveran and Mesnil in Paris, who in a long series of valuable researches have furthered our knowledge of the trypanosomes mentioned above, both in etiological and pathological as well as biological directions. In England the researches of Kanthack, Durham, Blandford, Plimmer and Bradford must not be overlooked. These are the most important works of latter years that have placed the trypanosomes in the forefront of the animal diseases caused by protozoa.

In human pathology these flagellated bodies—blood parasites—have only latterly become of interest, although Helir and Barron had reported doubtful cases of trypanosome-like forms in human beings. The report of Nepveu in 1898 sounds a little more certain. Trypanosomes were found in seven cases, of which six were malaria cases. As, however, these cases had been examined seven years before, and as the description before us of the parasite is very inaccurate, the matter must not be regarded as trypanosomiasis in man without some reserve.

The first case which was authenticated was observed by Forde and Dutton last year in Gambia, W. Africa. Forde first observed the parasite, but was doubtful of its identity, in a European who was suffering from a remittent fever, and showed also symptoms of great anæmia and physical weakness. In the fresh blood as well as in stained specimens trypanosomes were repeatedly observed, although generally in small numbers, and then only during the febrile stage. Dutton described the parasite more minutely, and thinks the parasite closely resembles the nagana parasite in its morphology. Developmental forms were not found and animal inoculation has hitherto only yielded negative results.

The same patient returned to Liverpool and was kept under observation in the School of Tropical Medicine (Liverpool) by Annett until death took place about a year and a half later. An autopsy was not made. The number of trypanosomes in the blood became more and more scanty during the last months of life, but the inoculation of white rats and monkeys showed their presence in the blood. The inoculated animals showed a chronic and progressive illness, generally fatal, and lasting generally two or three months, but the parasites were not always to be demonstrated microscopically. Dogs proved refractory. The accounts of the animal experiments are very scanty.

In the first report Dutton mentions that in examining the children in Gambia for malaria he found trypanosomes in an apparently healthy child of three years old in which the parasites were apparently the same as those described above. Malaria forms were also present. These researches determined the despatch of an expedition to Senegambia from the Liverpool School of Tropical Medicine to make a further research in cases of trypanosomiasis. The short preliminary report of Dutton and Todd concerning this expedition gives a note of finding trypanosomes in the blood of five out of 300 cases examined—once in a white man and four times in natives. Excepting in one case, which showed no sign of illness and yet in which the parasites were in greatest numbers, in one preparation amounting to twenty-seven, the cases showed the same fever, the same general weakness and enlarged spleen as in the first case. The parasite in the different cases were similar. The pathogenicity for animals has not yet been determined as far as one can see from the brief report. The authors think that the trypanosomes are more certainly found when centrifugalised blood is used. It may be also mentioned here that in one place trypanosomes were discovered in the blood of six horses which showed no special illness. In animals especially it seems that they behave in a manner not unlike the nagana parasites, although they show considerable morphological difference.

A short time subsequently Manson and Daniels reported (March, 1903) two cases of trypanosomiasis from the Congo (Leopodville and Monsambe) occurring in Europeans, which cases were watched in London. In both cases it is said that the remittent fever, accompanied by erythema on the leg, followed the bite of an insect. Manson expresses the opinion in the second case that the infection occurred through close contact with a patient also suffering from trypanosomiasis. Quinine in these cases was without result, as was arsenic, which in the Forde-Dutton case produced favourable results. The first patient of Manson's returned to Africa, the second is still under treatment. In the second case Manson saw two forms of development (swollen parasites, double flagella), followed by an increase in the number of parasites in the blood.

All inoculations in rats, mice, dogs, monkeys, horses, pigs, &c., had negative results.

From the Congo up to this time there were before us only a few reported finds of trypanosomes, apparently all in Europeans: One case of Le Moal's, in Brazzaville; one of Brumpt's, in Boumba, and two of Broeden's, in Leopodville. Leishman expresses the supposition that in one case of dum-dum fever in India he had seen developing forms of trypanosomes in the spleen. The same formation was observed by Donovan in the spleen of Indian cases. As the result of these observations during the last few years, notwithstanding the smallness of the numbers, it is now established certainly that the human pathology of the Tropics must recognise a hitherto unknown disease, called by the English trypanosomiasis, or Gambia fever, the exciting cause (Erreger) of which is the trypanosoma found in the blood.

In rapid sequel the trypanosome researches regarding the etiology of tropical disease have experienced a further advance, notably by the English. In the beginning of this year we were informed from London that Castellani, who had been sent out by the Royal Society to Uganda in Central Africa for the purpose of making researches into the cause of the sleeping sickness of the Blacks, was supposed to have found trypansomes in the cerebro-spinal fluid of the patients suffering from that disease (sleeping sickness).

The sleeping sickness of the Negro has to the present time been an unvestigated though interesting disease. It occurs in various parts of Africa in epidemics, and only attacks Negroes. The principal symptom is a lethargic (Schlafsüchtiger) condition, which ultimately becomes exaggerated into a deep coma. The course of the disease is chronic, and death almost invariably occurs in eight to twelve months.

The morbid anatomy of the disease, apart from the constantly present cerebral hyperæmia, is negative. Bacteriological observations have proved contradictory. Manson's theory,[1] which regards the cause of the sleeping sickness to be *Filaria perstans*, was also doubtful. Quite recently Ziemann declares the cause of sleeping sickness to be an intoxication contracted by eating raw manioc.

Let us now return to the interesting observations of Castellani, concerning which there are now before us more detailed reports. Castellani in examining the cases of sleeping sickness in Entebbe (Uganda) was struck with the happy idea of centrifugalising the cerebro-spinal fluid obtained *intra vitam*. About 15 ccm. of the fluid were obtained, and the supernatant blood stained 5 ccm. decanted off, the remaining 10 ccm. centrifugalised for fifteen minutes, and the sediment examined under the microscope. In this manner Castellani found the trypanosoma in nineteen out of thirty-four cases, or about 60 per cent.

In two cases the discovery was confirmed at the *post-mortem* examination, the parasites being found to be also present in the ventricles of the brain. The blood examination was only undertaken in a few cases, and in one with the positive demonstration of trypanosomes.

Castellani saw forms in the cerebro-spinal fluid, as well as in the blood, which he looks upon as developmental stages of this blood parasite. To control the researches, Castellani examined at Entebbe the cerebral fluid of twelve Negroes who had not suffered from sleeping sickness, but with negative results. Three other Negroes with fever, headache, and enlarged spleens, showed a few trypanosomes in the blood during the febrile attack, but malaria parasites were not to be found in these cases, minutely described by Baker.

Although Castellani for the first time brings forward the presence of trypanosomes in the cerebro-spinal fluid of cases of sleeping sickness in Negroes as the etiological and pathological factor, and though this obscure disease does not yet appear to be fully investigated, yet we think that on account of the large percentage of cases in which parasites were found we may venture to put forward the assertion that the trypanosomes stand in causal relation to the disease.

The presence of streptococci mostly found *post mortem* by Castellani and others seems to be a secondary infection.

The supposition already mentioned receives further support from the recent communication by Bruce, the discoverer of the nagana parasite, who was sent to Uganda to further investigate sleeping sickness. In all the thirty-eight cases examined Bruce found the trypanosomes in the cerebro-spinal fluid, and in twelve out of thirteen cases in which the blood was examined.

The recent report of Bruce to the Sleeping Sickness Committee of the Royal Society confirms Castellani's discovery of the presence of trypanosomes in the cerebro-spinal fluid of sleeping sickness cases. Bruce followed Castellani at Entebbe, and besides continuing the examination of the cerebro-spinal fluid by Castellani's method, collected evidence of the distribution of the tsetse-fly.

If we can look upon the discovery of Castellani with certainty we also raise the question of the method of infection of the disease.

The researches of the last few years have shown conclusively that blood parasites are usually inoculated

[1] Manson hardly promulgated the theory of *Filaria perstans* as a cause of sleeping sickness, but suggested its presence should not be overlooked and that proper steps should be taken to eliminate filarian origin.

through the agency of insects. This we may probably allow is the case with the trypanosome from the evidence we have before us.

In the case of the non-pathogenic rat trypanosome we have experimental proof of the infection by the agency of fleas, the theory being confirmed by Laveran and Mesnil. McNeal and Novy furthermore saw living trypanosomes in the stomach of the rat-louse. The tsetse-fly carries the nagana parasite in all countries where the disease exists; Bruce has proved this by means of experiments.

For the surra trypanosome *Tabanus tropicus* and *Tabanus lineola* are the infection carriers in India; whereas Curry found the surra trypanosome of the Philippines in the stomach and proboscis of the common horse-fly, *Stomoxys calcitrans*. The infection-carrying agent in the mal de caderas is, according to Elmassian and Lignieres, not yet certainly determined, although the latter has proved the presence of infective trypanosomes in the bodies of *Stomoxys calcitrans* taken from sick animals; Sivori and Lecler have, moreover, allowed sound horses to be bitten with these flies with positive results.

On the other hand, however, according to the researches of Schneider and Buffard, as well as Nocard, it is said that the spread of the dourine trypanosome takes place during coitus. Our own researches with the dourine trypanosome have shown that rats can be infected through the agency of insects, especially fleas. We placed male infected white rats with male non-infected white rats, and female infected grey rats with female non-infected grey rats, so that transmission through the act of copulation might be excluded, and in both cases obtained positive results. The transmission of the parasites by copulation was not so successful in the case of the dourine parasite (30-40 per cent.) as in the case of the rat trypanosome (75-80 per cent.). That the rat fleas are able to carry the dourine trypanosome we have shown, as was the case with the *Trypanosoma Lewisi* in our former experiments; we have also found the trypanosomes in the stomachs of the fleas. We were not able to demonstrate the infection with the dourine trypanosome through coitus in rabbits with the certain exclusion of the agency of insects.

Our researches with the dourine trypanosome will be shortly published elsewhere.

The foregoing results in any case lead us to consider that the disease dourine, supposed to be contracted during copulation (the symptoms and pathology of surra and nagana are very similar to those of dourine), may be also due to the agency of blood-sucking insects.

In the dourine region in Algiers nagana is also prevalent, as is shown by a recent report of Szewczyk. From de Deos comes the statement that a disease of horses associated with copulation is known in Sumatra, where nagana is also endemic. Moreover, Schneider and Buffard have lately brought forward the suggestion that Rouget must have worked not with dourine but with nagana material. It is possible, therefore, that we may regard the copulation diseases of these parts as surra or nagana respectively, contracted in one and the same animal by coitus; at any rate, such a presumption is by no means negatived. From the various reports on the disease dourine it is evident that the research is certainly not ended.

The majority of trypanosome diseases appear to owe their spread to some form of blood-sucking fly. The conjecture that these or other insects play a part as carriers of the parasite in trypanosome fever or in sleeping sickness caused by trypanosomes gains considerable support.

The late Dr. Livingstone and Sir John Kirk described the tick disease in the human subject as occurring in Portuguese South Africa on the Zambesi, while Daniels speaks of the tick disease of British Central Africa. The blood examinations carried out by the latter had only negative results. Manson is by no means averse to considering that the *Argas moubata*, accused by Livingstone as the cause of the disease, may be the parasite carrier in the Congo cases of trypanosomiasis which appear to have followed the bite of an insect. Moreover, in other places, mostly on lakes and rivers, where cases of trypanosomiasis have been observed it is probable that the tsetse-fly blood parasites have been insect-borne, and in all cases the tsetse-fly is present, as in the nagana regions.

This fly, *Glossina morsitans*, seems to be the probable and perhaps only carrier of the sleeping sickness parasite. In one of the last meetings of the Societe Biology, Brumpt declares this is very probable, as wherever the tsetse-fly is not found the disease does not appear to spread. Thus, for instance, several cases of sleeping sickness were taken to the Antilles, but the disease did not take root there. Among the different insects which molest man the tsetse-fly is absent there.

The fuller details given by Brumpt are most interesting. Thus in Banamia, on the Congo, among the 3,000 fisher-folk sleeping sickness has made such havoc that at the present time only 300 remain alive. There are in the vicinity the natives who live in a Trappist Mission, and who but rarely come down to the river, obtaining their drinking water from springs, and who have been entirely spared by the disease. On the river itself the tsetse-fly is present in great numbers, but in the Mission only twenty minutes away from the river no tsetse-flies are found. The inhabitants of another village who suffered very much and were living in the middle of a sleeping sickness district are now quite free from the disease since they started agriculture and no longer come down to the river, where they are attacked by the tsetse-fly. Sambon is also in favour of the suggestion of Castellani that the disease of sleeping sickness is spread by means of the tsetse-fly.

Now there is another question to be answered, namely, why does the sleeping sickness attack the Negroes only for the main part, although isolated cases of the disease in white men have come under observation. Perhaps the tsetse-fly is more attracted by the smell of the Negro, especially as this has been found in observations made by the malaria expeditions with Anopheles. Although the supposition hitherto accepted that men may be bitten by the tsetse-fly repeatedly, and yet escape without any serious disturbance, cannot be allowed in the light of the evidence we have before us, yet we must explain the fact of the escape of the

white man from sleeping sickness as due to racial immunity as the most plausible solution. It seems probable that sleeping sickness attacks Europeans with the clinically less marked and serious symptoms of trypanosome fever, which may be the converse in the native. We do not wish to exclude, moreover, the hypothesis which has been suggested by Laveran that men are not attacked by nagana because human blood serum has an inhibitory effect on the nagana trypanosome, as is well shown in his researches. According to the most recent work of Laveran, the human blood serum has the same influence on the surra and mal de caderas parasites; we therefore cannot regard the action as specific. According to our own researches, human blood serum influences the dourine trypanosome, and not only this, but the serum obtained from actively immunised animals (white rats) and passively immunised grey rats immunised to *T. Lewisi*.

The occurrence of trypanosomes in men in tropical districts, notwithstanding all this, is by no means common, and is not to be wondered at when we consider that the parasites are only in small numbers and isolated specimens, and even then only in the febrile stages. However, we know from the researches of Bruce that apparently healthy animals may have the nagana parasites in their blood; and Koch has also shown in human pathology that plasmodia occur in children with no clinical symptoms of malaria. What is the difficulty in the morphology, pathology and biology of the human and animal trypanosomes? Hitherto we have made the acquaintance of the parasites of surra, nagana, dourine, caderas, and the so-called parasites of trypanosomiasis and sleeping sickness.

The trypanosome found by Theiler in rinderpest at Pretoria must be looked upon as a special kind on account of its length (almost double). This trypanosome stands among the widely spread non-pathogenic trypanosomes of animal life and is nearly related to the trypanosome of the rat, *T. Lewisi*. The morphological similarity of the latter to the parasites of surra and nagana is such that all three forms may be looked upon as identical. Koch first succeeded in 1898 in determining the difference of the *T. Lewisi*. At his suggestion we have followed up the study of this kind of trypanosome. We have, moreover, for the first time made out the entire cycle of development of the *T. Lewisi*, as well as experimentally cleared up the natural mode of infection in rats.

(*To be continued.*)

Notes and News.

We are anxious to obtain information concerning a report that a steamer on the way from Penang to Singapore had plague and cholera on board, when 263 Chinese coolies died.

Zanzibar.—Dr. Oswald A. Browne, 9, Dartmouth Street, Westminster, London, S.W., will be pleased to give necessary information concerning a vacancy for a doctor in Zanzibar.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Beri-Beri.

Filariasis in Man Cured by Removal of the Adult Worms in an Operation for Lymph Scrotum, by A. Primrose, M.B., C.M.Edin. *Brit. Med. Journ.*, November 14th, 1903.—In a paper read before the Canadian Medical Association at Montreal, Primrose stated the case of a native of Barbadoes, who suffered from elephantoid fever, lymph scrotum, lymphadenitis and abscess, with varicose groin glands. On January 5th, 1901, the scrotum was removed in the hospital at Toronto. Previous to the operation, filarial embryos abounded in the blood; but with the exception of a cervical lymphadenitis, there have been no sequelæ, and the embryos disappeared from the blood. A further examination of the blood was made on July 25th, 1901—that is, six and a half months after the operation—by Dr. G. C. Low, who reported the absence of filarial embryos in the blood. This is the first recorded case of operation for elephantoid enlargement being followed by the disappearance of the embryos from the blood.

The Etiology of Beri-Beri, by W. Gilmore Ellis, M.D. *Brit. Med. Journ.*, November 14th, 1903, p. 1268. —From observations in the Government Asylum at Singapore, Ellis concludes that beri-beri is a place disease, and is not caused by rice-eating. He relies upon disinfection as the means of combating beri-beri, whether on board ship or on shore.

Plague.

Bubonic Plague ("Kampuli") in Central East Africa, by Cuthbert Christy, M.B., C.M.Edin. *Brit. Med. Journ.*, November 14th, 1903, p. 1265.—A disease called kampuli in Uganda, and "tubunga" in German East Africa, has long been familiar to the natives of these districts. Christy made careful search for cases of this disease, which is believed to be bubonic plague. He failed to find any actual cases at Entebbe, Budu, the Sese Islands, Musaku, Kiahogo, Bikira, &c. From the information he received, however, and especially from Dr. Feldmann at Fort Bukoba, he is of opinion that the diseases known as kampuli and tubunga are genuine plague. Christy supports Koch's contention that plague occurs in the Sultanate of Kisilia in German East Africa, and exists endemically at Bikira in Budu, a province of the Uganda Protectorate to the West of the Victoria Nyanza.

Spotted Fever.

Spotted Fever in the Rocky Mountains, by J. F. Anderson, U.S.A. *Hygienic Laboratory Bulletin*, July, 1903.—This fever is regarded by Anderson to be due to infection by tick bites. Persons engaged in out-of-door employments are most liable to the disease.

The period of incubation lasts about one week; the invasion is marked by high fever. The eruption consists of macular spots, which appear on the third day of the illness, and is first seen on the wrists and ankles, but spreads to the entire surface of the skin, being least marked on the abdomen. In four or five days the spots disappear on pressure, but afterwards they become petechial. Seventy per cent. of those attacked die, death usually occurring from the sixth to the twelfth day.

Trypanosomiasis.

NOTES ON THE BODIES RECENTLY DESCRIBED BY LEISHMAN AND DONOVAN, by Major Ronald Ross, F.R.S., C.B. *Brit. Med. Journ.*, November 14th, 1903.—Major Leishman, R.A.M.C., in a paper in the *Brit. Med. Journ.*, May 30th, 1903, p. 1252, described among the spleen cells and red corpuscles of a soldier suffering from low fever, chronic dysentery and cachexia, at Dum-Dum, near Calcutta, organisms consisting of small round or oval bodies, 2 to 3 μ in diameter, unlike anything he had hitherto seen. Capt. Donovan, I.M.S. had already recognised similar bodies in blood smears taken from the spleen of three consecutive cases believed to have died of chronic malaria in Madras. Ross examined Donovan's preparations, and found the bodies met with in the preparations to correspond in every detail with those described by Leishman. No entire trypanosomes were found by Ross in Donovan's specimens, and as two of the specimens examined were obtained during life the absence of these cannot be ascribed to *post-mortem* changes. Ross believes that "we have to do with some quite novel organism." The charts sent by Donovan, and the fact that there was chronic pyrexia with enlarged spleen, suggest to Ross the possibility of the diseases being kala-azar.

Yellow Fever.

EPIDEMICS RESEMBLING YELLOW FEVER, by Lieut. James Carroll, U.S.A. *Journ. Assoc. of Military Surgeons*, November, 1903.—Carroll considers yellow fever to be a widespread disease, and not confined to the West Indies or East Africa. He believes that the disease known in England in former times as putrid fever may have been yellow fever, and that several of the undermentioned recent outbreaks of "fever" in India are of the same nature. In Siam the disease termed *La maladie de Siam* was probably also yellow fever; and the outbreak quoted by Davidson at Edam Island, near Batavia, was likewise the same disease.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

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The Journal of Tropical Medicine.

CONTENTS.—DECEMBER 15TH, 1903.

Original Communications.

CLIMATIC BUBO IN UGANDA.

By ALDO CASTELLANI, M.D. (Florence), AND GEORGE C. LOW, M.A., M.B.

(From the Laboratory of the London School of Tropical Medicine.)

THE history of this disease only dates back to 1896, when Ruge reported several cases suffering from inguinal buboes, in which the usual causes of such an adenitis were all absent, and he was therefore inclined to consider the disease a separate entity dependent probably on climatic influences.

Goding, independently of Ruge, published about the same time a series of cases apparently of a similar nature, and since then other observers (Skinner, Scheube, Martin, Nagel, Cantlie, Manson, &c.) have also encountered this complaint. Recently Verth, in the *Archiv. für Schiffs und Tropen-Hygiene*, has published a very full account of this malady.

The chief geographical distribution of climatic buboes appears to be on the east coast of Africa, the West Indies, Straits of Malacca and China. No records are found of its presence in the central parts of Africa.

While in Uganda we came across a well-marked example of this disease, and the following are the notes of the case :—

Simeoni, male, aged 25, interpreter, native of Uganda.

Family History.—Both parents dead, cause unknown ; one sister, five brothers, all living ; healthy.

Personal History.—Patient educated by the Roman Catholic missionaries as a boy ; after that employed by them. Has never done manual labour. Has never been out of Uganda. Married two years ago ; no children.

Previous Illnesses.—Measles when a child. One year ago smallpox, slight attack, few marks left. Never gonorrhœa, syphilis, or other venereal complaints.

History of Present Attack.—On August 20th, 1902, patient began to complain of pain in the right inguinal region. He felt ill and feverish, but he was able to discharge his usual duties. On the 22nd his symptoms became worse ; he had chills, felt weak, had difficulty in walking, and was unable to work. He reported himself sick on that date.

State on Admission.—Patient looks ill ; temperature, 101·8° F. ; pulse 100 ; respirations, 14. Inguinal glands on both sides much enlarged ; very painful on pressure, especially on right side, and in the latter situation, one gland as large as a hen's egg. No fluctuation obtainable, no lymphangitis, no wounds or scratches visible on legs or feet, no sores of any description on genitals. His work has always been of a sedentary nature, working in laboratory. Had not been marching previous to attack.

Physical Examination of the Different Systems.—This revealed nothing.

Treatment.—He was ordered to rest in bed and to apply hot fomentations locally.

Further Notes.—On the following day he felt better, the temperature having fallen to 99·4° F. in the morning, though it rose again to 100 in the evening. The glands were less painful but still of the same size. No fluctuation. For some days the improvement went on satisfactorily, a slight evening pyrexia, however, persisting. On September 5th pain returned on the right side, but this again disappeared in a few days and the glands became smaller. All the other symptoms gradually passed away, and the patient felt quite well and went on with his work.

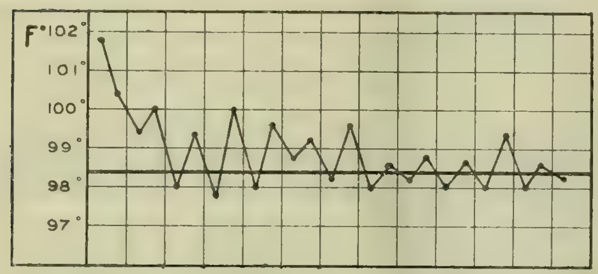
An examination one month after showed that there still existed some enlargement of the glands that had been affected, and especially of the right side, the consistence still being hard and indurated.

Special Examinations.—Blood : The blood was examined on the night of the 22nd, and on subsequent evenings for *Filaria perstans* and *Filaria nocturna* with negative results. No malarial parasites were found.

Bacteriological Examinations.—The skin of the right inguinal region having been thoroughly disinfected in the usual manner, the large gland was aspirated with a sterilised syringe and a quarter of a cc. of blood-stained liquid was drawn off. This on microscopical examina-

tion consisted of pure blood. Fresh and stained preparations did not show any organisms. Several tubes of broth, gelatin, agar, &c., were inoculated, and gelatin and agar plates made, but no bacterial growth resulted. After a few days another gland of the same group was aspirated, a similar fluid being obtained also with negative results. There was no sign of pus formation.

The case is interesting from the point of diagnosis, especially so as one had in view the statement of Koch and Zupitza that plague occurs in Uganda. When the patient was first examined the clinical symptoms were undoubtedly suspicious. There was the high fever and the formation of a bubo, but the bacteriological examination cleared up the case at once, and the course of the disease confirmed this.



It is possible that similar cases may have been mistaken by the missionaries for real plague; though the past history records many examples of a very fatal disease known in Uganda as "kaumpuli," and which answers closely to bubonic plague, it is strange that none of the medical officers now in the Protectorate have ever seen examples of this disease.

While we were in Uganda, Dr. Bagshawe, who was to accompany the Anglo-German Boundary Commission, specially investigated this subject in Bikira in Buddu, near the German boundary, where an outbreak had been reported. In a letter received from Dr. Bagshawe, after he had examined the locality carefully, the conclusion reached was that at the time he visited this area there was no sign of plague.

REFERENCES.

Cantlie, "A Lecture on the Spread of Plague," *Lancet*, January, 1897.

Goding, "On Non-Venereal Bubo," *British Medical Journal*, 1896, September 26; also 1897, June 12.

Martin, "*Aerztliche Erfarungen über die malaria der Tropen-Länder*," Berlin, 1889.

Manson, "Tropical Diseases," 1903.

Nagel, "Klimatische Bubonen," *Münch. med. Woch.*, 1898, No. 9.

Ruge, "Die der Zanzibar Küste eigentümlichen Leistendrüsenentzündungen," *Arch. f. Dermatol. u. Syph.*, xxxvi., No. 3, 1896.

Scheube, "Ueber Klimatische Bubonen," *Deutsch. Arch. f. Klin. Med.*, 64, 1899; and "Diseases of Warm Countries," 1903.

Skinner, *British Med. Journal*, January 9, 1897.

Verth, "Beobachtungen über Klimatische Bubonen," *Archiv. für Schiffs und Tropen-Hygiene*, Bd. vii., Heft. 2, Leipzig, 1903.

THE PREPARATION OF PERMANENT STAINED SPECIMENS OF AMŒBA COLI.

By Thomas Hart.

Seamen's Hospital, Greenwich.

Film preparations to demonstrate *Amœba coli* are as a rule generally found not to give satisfactory results. This is no doubt due to the comparatively large size and delicate structure of the organism.

By mixing in a test tube a large volume of the infected material (either pus from a hepatic abscess or mucus from dysenteric stools) with a dilute logwood stain and collecting the resulting dyed matter in glycerine, quite good results may be obtained.

The following are details of the method:—

Staining Solution.

Hæmateïn	3 grains.
Potassium alum	1 grain.
Acetic acid, B.P. (33 per cent.) ..	1 minim.
Alcohol	80 minims.
Distilled water	to 1 fluid ounce.

To be used diluted with about four times its volume of distilled water.

(1) Fill a test tube to two-thirds of its capacity with the diluted logwood stain; add the infected material to the extent of about half an inch and diffuse by shaking gently for a few minutes. Any coarse particles are removed by straining through gauze and rejected. After standing for three hours the stained cells will be found to have settled to the bottom and the supernatant fluid can be poured off.

(2) The colour of the stained structures is now to be developed by nearly filling up the tube with tap water or a weak solution of lithium carbonate (half a grain to the ounce). Glycerine, sufficient to form a layer of say three-quarters of an inch at the bottom, is then carefully added to the tube. It is now set aside to allow the stained material to settle down into the glycerine. Deposition will have taken place in six or seven hours.

(3) The supernatant fluid is poured off and the stained material in the glycerine transferred to slides and cover-glasses cemented on.

When the amœbæ are to be mounted in Canada balsam the procedure is somewhat different and not quite so simple. Glycerine must of course be omitted.

The water having been poured off from the stained material, dilute alcohol is added and the tube is set aside for an hour or two. The deposit is then collected on a filter paper and drained.

The filter paper with its contents is then folded up, to form a packet, tied with a thread, and suspended in absolute alcohol to dehydrate. When dehydration is considered complete, transfer the packet to some clearing agent and again to a fresh supply of the clearing agent. (Rectified coal-tar naphtha answers the purpose admirably and is inexpensive.)

The cleared preparation, after draining, can then be mounted in Canada balsam in the usual way.

MUNICIPAL SEWERAGE.

By Major Fred. Smith, R.A.M.C.

(*Continued from page* 355.)

Domestic Drainage and Conservancy.

Pathogenic Germs in Cesspools.—As to how long pathogenic bacilli live in these places we do not know, but probably not for very long. Manson[1] says that the embryos of the ankylostomum will not live in the excreta fermented and rotted in the store-pits of the Chinese—the case, however, is not quite the same, as the Chinese pits may not be having continual additions of fresh fæces like the cesspit. The cesspit may be looked upon as a septic tank, and, conversely, we may regard the modern septic tank as a glorified cesspool.

Defence of the Cesspool.—I may say that I think the danger to health from cesspools—except as regards contamination of drinking water—have been much overrated. More, I am not aware that actual specific illness has ever been definitely traced to cesspools, except when drinking water has been polluted. I would go further, and say that in those places in which there is a pure supply of water through pipes, *i.e.*, where well-water is not used; where the soil is porous and not water-logged; where the cesspools are not too close to each other, and where they have 18 inches to 2 feet of earth above them, the cesspool of itself does not constitute a greater danger to health than do the drain pipes and sewers ramifying the soil. I should say that in such cesspools the amount of brick or stonework about the pool should only be just sufficient to preserve its form and prevent the earth from obliterating it by falling in. Rideal says that "in towns, the crowding together of cesspools renders a large area of soil water-logged with black and fœtid matter, which undergoes little or no oxidation"; and "at Hampstead . . . . the earth and often the basements were heavily infiltrated." On what grounds the statement is made does not appear, but if anyone watches the taking up of pipes in the streets of London now he will find the soil is still black, water-logged and fœtid, even in the best streets—possibly owing to the low elevation and the nearness of the river. As for basements, in the house in which I am writing the cellar is just being cleared of sewage, which has got into it from a modern drain pipe which choked and burst.

For all that I have said above I am not disposed to advocate cesspools for general use, especially in large towns, if any better system can be found. I am aware too that to commend cesspools under their own name is a bold procedure, but as before stated it has yet to be shown in what way they are necessarily harmful—more harmful, that is, than other systems. Farther on we shall see that more fashionable modern plans are also likely to foul the drinking water, and that on the more extended scale than the cesspool. For after all an epidemic (of enteric for instance) is not looked for, or at any rate it would be of slow development, in a cesspitted place. A household only or perhaps two or three families would be affected by the pollution of one well (I am assuming that cesspools would not be placed near public wells), whereas a poisoned river or reservoir may attack large numbers simultaneously, *e.g.*, the Maidstone outbreak.

Complete Water System. — Surgeon - Major E. A. Parkes, F.R.S., wrote in his "Manual"[2] concerning the removal of excreta by water: "This is the cleanest, the readiest, the quickest and in many cases the most inexpensive method," but he modifies this statement by pointing out some dangers in the water system.

(7) *The Water Closet Discharging into a General Water System of Sewerage.*—This, the last system to be described, is that most in use in European countries; for the large towns and under suitable conditions it is probably as perfect as any at present known. Any evils lie not so much in the house portion of the drainage as in the municipal portion of it—the main sewers, that is, and the outfall. But the drains just outside the house are liable to get out of order. Once the drains are put down they are rarely taken up again or examined unless sewage appears in the basement or somewhere else on the surface—perhaps the whole system is blocked and the closet pan cannot be emptied. In the latest made drains, however, inspection manholes are provided and the choking nuisance thereby mitigated. But anyone who takes the trouble to go and see drains taken up for any reason will become aware that drains which do not leak somewhere are not very common. Theoretically, the pipes are close fitting, sealed with cement, laid in a firm bed and, moreover, a bed which is equally firm in all portions of its extent—a very unusual condition it may be thought. Practically these things are only partially existent, the pipes sink in parts and break, &c., so that danger to water supply is nearly as bad as in the case of cesspools—in some respects worse, owing to the false sense of security engendered, permitting wells to be too close to the drains. The drains are not infrequently near to the water pipes too. Fortunately, water pipes are of metal, and not likely to be broken, but under the head of "municipal sewerage" will be described a way of contamination of pipe water by sewage.

The things to be said in favour or disparagement of the method—as regards household drainage—are the same as those mentioned under system No. 6, except that in the present case there is no cesspool to be emptied on the premises. The water closet shares with all the sanitary appliances the liability to go wrong owing to misuse.

The Closet at its Worst.—To understand what frightful objects water closets may become we must go into the habitations of the poor, who after all form the majority of the population, and are the most prone to suffer from zymotic sickness. It is the exception to find an effective water supply or adequate flushing arrangements; a clean pan is most unusual; everything which ought to be is not; the pan is of old pattern, badly joined on to the pipes, perhaps not trapped; the closet is most

[1] "Tropical Diseases," 1900. Cassell and Co.

[2] "Manual of Practical Hygiene," E. A. Parkes. J. and A Churchill.

likely used by several families, it is consequently nobody's business to look after it; the pan is half full of foul matter; the closet floor is wet with urine, so is the seat; possibly there are fæces on the floor owing to someone's objection to using the wet seat, so that altogether what ought to be a model appliance is an indifferent privy. If a trough had been supplied matters may not be quite so bad, but this is unusual in private dwellings or groups of dwellings. The habitation of the poor man in a town consists generally of one or two rooms in a house formerly occupied by one richer family and now given over to as many poor families as can be got into it. The provision of increased accommodation is unusual except under legal compulsion, and the consequences are as stated—with all due respect to some of the more enlightened Councils.

Obstruction of Closets by solid Objects.—A great difficulty about w.c.'s generally is that the uneducated classes rarely understand anything at all about the construction of such an appliance. They regard the pan as a convenient hole in which to dispose of all sorts of things which such a contrivance is quite unable to deal with. The result is that pipes burst, or excreta comes through ventilators, regurgitates into pans, &c. If none of these things happen insanitary fouling of the soil is caused every time the pipes have to be taken up in order that the obstruction may be removed. In large institutions, barracks, &c., this is a constant source of trouble, expense and annoyance. If such things happen among disciplined bodies, where sanitation is being constantly practised in sight of the men, what must be the state of affairs in an irresponsible, overworked, poverty-stricken community. In barracks, for instance, the soldiers themselves take it in turn to form members of fatigue parties told off to clean latrines daily, yet the records of any Royal Engineer District Office will show that drains are again and again blocked by articles which ought not to go into them at all—and this in spite of the fact that the soldier is often made to pay, in the form of "barrack damages" a share of the expense of the clearing operations entailed by the improper use of the w.c.'s. Personally, I have seen taken out of drains in barracks such things as, among others, bottles, jam tins and pots, glengarry caps, linseed poultices on tow, woollen socks, broken tobacco pipes, mutton chop bones, &c. On one occasion I came across a man in the act of endeavouring with a stick to induce a pair of trousers to disappear out of his sight down a w.c. Nothing remained in view but a piece of one leg, and the rest of the garment having gone too far to be drawn back, the delinquent was in a hurry to hide the evidence of his crime from any responsible person who might identify the trousers. I say delinquent, because there was a large notice paper in the closet promising punishment to anyone who should so misuse the appliances provided for his comfort and good health. Where troughs are used, as in some of the barracks, instead of single pans, there is less liability to obstruction inasmuch as the pipes are larger.

The point intended to be emphasised by the above is that all the known systems are far less perfect in practice than in theory.

The good sanitary appliances of modern type, which entail expenditure of large sums of money to begin with, require intelligent appreciation on the part of the users, if they are to be any better in practical value than the primitive means of our ancestors. When the school authorities take to teaching elementary hygiene properly to children we may hope for some improvement. Probably modesty will for a long time to come prevent us from instructing children in the art of safely removing excreta.

Religious Difficulties.—A difficulty about the using of any sanitary appliance in the Tropics is the religious one. The great Moslem sections, for instance, object more than the rest of us to being soiled by urine, even if it be their own. No good Moslem would squat on a soiled stand—the Mahomedan does not sit down in the European fashion to void his excreta. Therefore, the stand must be kept clean for him, because, although he dislikes filth he also dislikes removing it. Still, something must be done; excreta must be removed in such a manner as to cause the least harm to the mass of people.

A Moslem Privy.—Although the Islamite prefers to find a secluded place and there deposit his excrement, he does sometimes build a closet, generally for his women folk. I have seen such in the shape of a cess-pool as privy—a deep hole in the ground. This hole had a small surface opening, and around this a raised mud wall on which the users could perch. There were generally a couple of mud steps leading up to the wall, and the latter was about 8 inches wide at the top—the top was invariably more or less polished by the feet of the people. When the pit was nearly full it was filled up by demolishing the wall and steps on the top of it, and a new site was found for the privy hut. One privy lasts a long time, as it is not lined in any way. No danger beyond any which may be supposed to be conducted aerially can arise from such a practice in a country village unless water is contaminated.

Before deciding upon any plan of house drainage it will be well to consider the various municipal systems, for the two are bound up together. I have first, however, to say something about house drainage for surface water, slops, &c. A few lines may be devoted also to the subject of solid refuse, though it is not clear from the title of the article that this is expected.

(8) *Household Drainage for Surface Water, Slops, &c.*—This is not much less important than the matter already discussed. In Europe the surface water is sometimes conducted into the house drains (more particularly the water off the roof), and the slop water usually is—special provision being made for storm water. In other cases the surface water is dealt with separately—where one of the dry methods is in use it must be so. When the roof or the surface water is admitted into the drains it helps to flush them and carry along the contents. The storm water of most tropical countries is, however, so immense in volume and so sudden in its coming that it cannot be treated exactly the same as in Europe; the drains and sewers would inevitably burst or overflow unless they were made so large that the contents would be stagnant when the storm water was not present. Moreover, there is the dry season to be reckoned with—a period

during which there will be absolutely no water in the drains except such as may be artificially supplied.

Where there is any provision for waste water in the Tropics beyond that provided naturally by the lie of the ground and the wearing effect of water, it usually takes the form of a system of open surface drains, general more or less imperfect; but where such drains are well laid at a proper level and plentifully supplied with water for the dry season, they are not productive of a great amount of smell, nor, as far as we know, of disease. They have the merit of simplicity —a great desideratum among natives[3] — and the only thing necessary to keep them in order is an occasional brushing. It is true that the people throw all sorts of rubbish and filth into them but, this is in a way a good thing; it prevents them from committing worse evils. The house drain begins in an outdoor shallow convex slab or sink at the ground level, and on this the native cleans fish, vegetables, &c. In the better-class houses there may be a sink inside the kitchen and a pipe therefrom through the wall to the head of the surface drain. Surface water from the grounds and the roof is conducted into the same drain, which it tends to flush and keep clean. The house joins the street drain at the side of the road near the house; it passes below the level of the flooring, and in this part of its extent is usually covered with a board or slabs of stone. In a well-ordered community the householder is responsible for his house drain. It is, of course, essential before he assumes this responsibility that there should be a street drain (not by any means a universal reality) into which he can lead his house drain. In one eastern town in which I was for a short time Health Officer, I found that the Municipality had an elaborate code of bye-laws dealing with drainage. There were all sorts of printed forms of summons, from which one could be selected to meet almost any case. These were served on the householder or landlord as the case might be, by the Health Officer. A man would be called up to fill up a pool or an old well in his garden or yard, to provide a proper drain for his yard and house, to keep the drains clean, remove rubbish, cut down obstructing grass and herbage, and so on. If he passed the time of grace without complying he was hailed before the magistrate, who gave an order, a fine and costs, with a cumulative penalty for neglect to comply. If he still failed to comply, the work was done by the Municipality, and the man charged for this in addition to his fines. The last resort was rarely required. Under this system, vigorously but tactfully carried out, great results were obtained from the natives, and, more, the people were educated up to knowing that something also was due to them, and the Municipality was being continually called upon by individuals to fulfil their part of the contract and make it possible for the people to comply properly with the bye-laws.

As far as I am able to judge, I should say that the manholes over the mains in the streets of some of our up-to-date towns are more offensive than the open drains above described.

There is no reason why the street drains should not be covered in the greater part of their extent; as a matter of fact, in the town spoken of above, the terminal portions of the surface drainage system were built up and closed in channels the same as ordinary sewers, and so arranged that a man could walk along them, for inspection purposes, by a footway inside.

West African Lethargy.—In a West African town, notoriously unhealthy, I saw a large well-built main surface drain, which had been made by cementing the bed of the local stream. This was evidently the result of a mere sanitary spasm; I found this fairly perfect drain blocked by rubbish, which one man could have cleared away in half-an-hour, and no attempt apparently had been made to get house and street drains made to culminate in this large drain. West African lethargy had prevented more being done; within fifty yards of the cemented main was a long virtually stagnant ditch, simply swarming with Anopheles larvæ. In another West African town I saw many places in which such drains as there were in the streets had been in some places purposely dammed by the people in the adjacent houses, in order that they might have a handy water supply during the rainy season.

(9) *Solid Refuse.*—Solid refuse is sometimes thrown into built up "ashpits" or "refuse pits," "middens," or whatever they may be called, to be removed when the receptacle is full. This system was usual and is common in England, but iron-bins are now more common. A later development is the provision of a pail for each house; the pail is put outside the house every morning, and the passing scavenger empties it into his cart. This last was the practice in the enlightened eastern town before alluded to. In most tropical places, however, as in many British towns, a good deal of the refuse is simply thrown in a heap on the ground—for all people seem instinctively inclined to accumulate refuse in one spot, presumably only to get it out of the way of locomotion, &c. Some careful householders make a practice of burying the refuse in the garden; others, the most sensible of all, it may be thought, burn it. Burning is fairly easy in a kitchen fire where coal is used, but not quite the same in the outdoor wood fire, or wherever there is no grate—it is not likely to be done by a native, inasmuch as it would not only take time and trouble, but increase his consumption of fuel. The best practical method is the large iron pail or tub, preferably with a lid to reduce smell, prevent access of disturbing wind and keep off flies, chickens and children. Unless the method is made compulsory, and none but Municipal pattern pails allowed, it has elements of failure. The householder will substitute a box or basket for the pail; he not infrequently will deposit a heap of refuse on the bare ground in front of his house—this last is productive of much nuisance and street pollution; when not promptly removed by the Municipality—and, in my experience, Municipal servants often do their work even worse than contractors—the heap of rubbish is spread all over the street in the course of the day, a few fowls and an infant or two are usually to be seen amusing themselves with it, and, on the whole, it might as well have been left on a refuse heap in the garden.

It is well to remember that fæcal matter is not infrequently found in the refuse pail.

[3] I use the popular misnomer native to signify coloured, uncivilised, or partly civilised people.

TROPICAL HYGIENE.[1]

By W. J. Simpson, M.D., F.R.C.P.

Lecture V.

(*Continued from p.* 227.)

Collection, Removal and Disposal of Waste Matters.

We shall now take up the subject of the removal and disposal of waste matters.

Waste products undergo a more rapid decomposition in warm than in temperate climates, which necessitates their removal from dwellings as early as possible. If the climate is dry, both the removal and the disposal present but few difficulties, but it is otherwise in damp climates and in the region of tropical rains. Then the procedure becomes much more complicated. The rainfall is not distributed equally over the year in moderate showers, but it is confined to one or two rainy seasons in the year, and the showers are very heavy. Even in those regions on or near the Equator where the rainfall is more frequent the showers, though they may be short in duration, are very heavy while they last. The result is sudden flooding, protection against which is not easy.

As elsewhere, the waste products to be removed chiefly consist of domestic refuse, human excreta, solid and liquid, slop water, and the solid and liquid waste of animals kept for domestic and trade purposes.

The most important of the waste products to be dealt with are the excreta and the sewage; the method of removal depending on the existence or not of sewers.

As a rule there are no sewers in villages and in small towns, and in these the waste products have to be removed either by manual labour or cartage. In places in which there are sewers the water carriage system prevails, and foul water and human excreta, solid and liquid, are removed by the sewers; or the water carriage system and the dry system may be employed separately, the foul water and urine passing direct into the sewers, while the excreta, solid and liquid, may be removed by cartage.

Vegetable-feeders eat a greater quantity of food than meat-eaters, and their fæces bear a relation to the amount of food taken. There is no difference in the quantity of urine. But as in the Tropics, India especially, water instead of paper is used for cleansing purposes after the bowels are emptied, this ablution water adds to the quantity to be disposed of. Roughly, the excreta, both solid and liquid, of vegetable-eaters in the Tropics is one and a half to two times that of meat-eaters, *i.e.*, a good average would be 8 ounces solids and 80 ounces liquids, including ablution water. If there is no ablution water the liquids would be reduced to 40 ounces.

The quantity to be dealt with in a given population is obtained by multiplying the 8 ounces solids and 80 ounces liquids by the number of people. For example, for 1,000 inhabitants, 500 pounds of solids and 500 gallons of liquid would have to be removed daily. If ablution water was not used then there would be 250 gallons of liquid (1,000 ounces is a cubic foot—6·25 gallons = 1 cubic foot). These estimates for a mixed population with women and children are probably somewhat high, but it is better to estimate for maximums than minimums. Without ablution water it may be roughly taken that each person in the population will give from 14 to 15 cubic feet of solid and liquid excreta in the year, and that amount has to be removed. If there is ablution water it will be raised to 20 or 25 cubic feet.

These are important figures in estimating the amount of land that may be required for the disposal of the excreta, solid and liquid, as well as the number of carts that may be required for removal.

To calculate the number of buckets or carts the following data are useful: Each bucket holds 1 cubic foot. Each cart holds 12 cubic feet. With 500 gallons there would be 500 = 80 cubic feet. Or with 250 gallons there would be 250 = 40 cubic feet. This would require in the first eighty buckets, if they went only once to the trenching ground, seven carts if only one trip, four carts if two trips.

When the urine and fæces are mixed decomposition sets in very rapidly, giving rise to the liberation of ammonia, fœtid organic gases, carburetted hydrogen, &c. It is therefore better, if possible, to keep the solids and liquids separate. Urine when passed into water will remain free from smell for a considerable time. In India and in the East generally the natives squat to empty the bowels, so that where latrines are provided, the seats have to be specially constructed. For natives in villages where plenty of space is obtainable, and where much prejudice exists against using properly constructed latrines, the simplest and most effective mode of conservancy is to set apart a piece of ground well removed from the village; screen off compartments for the man and for the women and children, dig in these compartments a shallow trench, and insist on the villagers using them. A small quantity of earth should be thrown on the excreta daily. The trenches should be covered up periodically with earth. These trenches should not be more that 1 foot deep and 9 inches wide. The person using the trench can then squat in such a position that he has a foot on each side of the trench. Squatting in this manner will ensure the whole of the urine and the ablution water passing direct into the trench. Another mode of using these trenches, especially if the latrines are required to be of a more or less permanent nature, is to arrange in connection with them a small filter for the urine and the washings, and partially fill the trenches daily with dry earth which may be removed after the daily defilement. In all cases the excreta must be covered with dry earth immediately. It is only in this way that the latrines can be kept cleanly and free of offensive odours.

In some localities it is impossible to get the people to use trenches. Under these circumstances the compartment of the latrine should be covered with a layer of dry earth and the deposit covered over with dry earth immediately; the whole of the earth mixed with excreta being removed daily and a fresh layer of dry earth put down.

[1] Professor Simpson's previous lectures on this subject were published on May 1, May 15, June 1, June 15, July 1, and July 15, 1903.

This is also an excellent method of dealing with the excreta of large encampments of coolies and other large gatherings. The main point is to have some one to attend daily to the compartments, to see that they are kept clean, that the trenches are in proper order, and that the daily excreta are covered. This primitive system is well adapted for hot countries in the dry season. The latrines may often be open and exposed to the sun with very great advantage; but during the rains, unless the latrines are protected from the rain and the trenches from flooding the nuisance will be very great. The compartments of the latrine can be sufficiently protected by bamboo and mat roofings supported on poles, and the trenches can be kept free from the possibility of flooding by sloping the ground immediately outside the latrine in the opposite direction to the latrine.

The secret of success in any conservancy system in the Tropics is the protection from rain and floodings. If rain and flood water be carefully excluded from the latrines the amount of excreta, solid and liquid, is always within manageable quantities, and if it has to be carried from the latrine to a place for its disposal there is no difficulty in calculating how much is to be removed, and the service that is required for that purpose. But if rain or flood water is admitted then it becomes an impossibility to efficiently remove the sewage and the whole becomes a fermenting mass of putrefaction, creating a most offensive nuisance which no amount of labour can effectually remove. The great first principle, therefore, in providing latrines, of whatever kind they may be, is to exclude rain and flood water. If this is done conservancy becomes just as easy a matter in the Tropics as it is in the best conducted places in Europe. Without giving practical shape to this principle the best latrine system will rapidly be on a par with the worst. This principle has never been sufficiently grasped, and it is due to the failure to protect against the rain and flood water, combined with the want of calculation of the daily amount of excreta which a population is constantly supplying, that even the best latrines have in the Tropics failed and have presented in a short time no improvement on the most primitive kind.

Whether the latrine is public or private, distant from dwellings or on the premises of a private house, the same principle of protection from rain and flood water must be borne in mind. The kind of latrine then becomes a matter of contrivance for the engineer or the medical officer.

Separation of Solids from Liquids in the Latrines.—In India, where the natives use so much water for ablution purposes after defæcation, the liquid is often separated from the solids. This is effected by so arranging the seat on which the person squats that the urine and washings are conducted by a conduit or pipe to a receptacle situated below the front part of the seat, or at a convenient site elsewhere inside the latrine, and that the solids fall direct into another receptacle immediately below the seat. This receptacle should be sufficiently near the seat to prevent the possibility of the excreta falling anywhere else but inside the receptacle. The defect in a large number of latrines is having the receptacle too far from the seat, hence splashing is produced, with the result that the privy vault becomes foul. In extreme cases, which are not uncommon, the latrine seat is on an upper floor of the house and the receptacle in a vault on the ground floor, the communication being kept up by a large shaft. It is unnecessary to say that these latrines are extremely insanitary; the floor of the vault becomes covered with filth and the walls get splashed with the falling excreta. It is impossible to keep these vaults or the shaft clean; in all cases, therefore, the receptacle should be close to the seat. The receptacle may be a galvanised pail, which is somewhat expensive, or a tarred earthenware vessel. Wooden pails or tubs are not adapted for the purpose, but if no other are obtainable they should be tarred. In hot countries the excreta, both solid and liquid, should be removed at least once in twenty-four hours, and twice a day if practicable.

In the case of Europeans the commode is the best sanitary appliance. Placed in the bathroom it can be emptied at once by the servant in a covered iron receptacle kept in an outhouse and brought back to the bathroom clean. The iron receptacle is emptied and cleaned at least once in twenty-four hours, the contents being taken by the scavenger in a soil cart or in soil pails. Sometimes earth closets are used and sometimes pail closets, ashes or sawdust being used to cover the excreta. In a dry earth closet of vegetable-eaters, $2\frac{1}{2}$ lbs. of earth instead of $1\frac{1}{2}$ are required for deodorisation. Every kind of dry earth is not suitable for deodorising purposes. The best are loamy surface soil, vegetable mould, brick earth and dry clay. The earth should be first dried, then sieved. Arrangements are usually made that the scavenger should be able to get at the receptacles belonging to the latrine without entering the house. This is usually effected by having the latrines placed at a little distance from the house against the outside wall of the premises, access being gained to the small chamber underneath the seat from a small door fixed at the back. The chamber which contains the receptacles should have its floor and walls well cemented, and should be watertight. The seats are made of iron, brick set, and faced with cement, glazed earthenware, or wood coated over with thick paint.

Application to Land Best Mode of Disposal of Excreta.—Having collected the excreta, solid and liquid, in either soil pails or soil carts, it has to be disposed of, and the best method of disposal is undoubtedly its application to land where its fertilising properties can be employed to advantage. If the separate system has been adopted from the commencement, the application to the land is much easier than when the solids and liquids have been mixed together. In pails, for instance, the solid excreta has a quantity of dry earth added to it, and then it is carried to the jail garden, where it is placed in trenches to a depth of not more than 3 inches. The trench is then filled up. Separate trenches are used for the urine and ablution water, or the liquid may be used for watering the garden. For the disposal of the excreta from village latrines, as mentioned previously, two kinds of trenches may be used:—

(1) Trenches 18 inches deep and 2 feet wide in parallel lines and 2 to 3 feet apart from each other. The night soil should not be more than 8 inches deep and then covered with earth. Urine should be disposed of in a similar fashion. Each trench should be marked with the date on which it was used, and vegetables, tobacco and rye grass should be grown on them.

(2) The trenches should only be 9 inches deep and only 2 inches of night soil placed in them.

When the solids and liquids are mixed, if the cart has to carry the mass some distance to the trenching ground, the contents of the cart get into such a colloid condition that it is difficult to deal with. Special care must be taken that the trenches are shallow—9 inches in depth is quite sufficient—and not more than 2 inches of the mixed excreta put into the trench.

A quarter of an acre of land does well for 1,000 persons if the trenches are 18 inches deep and 2 feet wide, and 8 inches of night soil put in them; but if the trenches are only 9 inches deep and 2 inches of night soil put in them, one acre will be required for 1,000 persons.

Removal and Disposal of Slop Water.—From a household, in addition to the excreta already dealt with, the slop water has to be removed. In villages where there are no drains and no garden to dispose of it, the slop water is collected in tubs, which are emptied daily by the scavenger who comes round with the slop cart and removes it to the trenching ground. When there are no slop carts and no drains, the sullage water may be purified by constructing a trench 18 inches deep and 2 feet wide, loosening the earth at the bottom of the trench, then filling it with 4 inches of rough stone or broken metal, covering this with 6 inches of clean gravel, then 6 inches of sand, and on top of all a single layer of stones or a perforated metal plate to keep the sand in position. By throwing the sullage on to this filter the sullage water will be purified and will soak into the ground without creating a nuisance. When drains have been laid on the premises and there are no sewers, the sullage water can be led to the filter, which can be made wider, but not deeper, according to the size of the house and the number of the inhabitants. Care should be taken that the trench is not subject to the flow of flood water.

Certain Points of Difference in the Sewers of Tropics and Those of Temperate Climates.—In towns with drains and sewers the system of removal and disposal of the sewage, solid and liquid, conforms closely to that adopted generally in Europe. There are, however, certain important points of difference. First, the system which is best adapted for the Tropics is the separate system, that is, the storm water has, in all instances, to be separated from the sewage, the storm water going direct to the river, the sewage to the land to be purified before admission to the river. The reason for this is that the rains are so heavy that if the sewers are made of sufficient dimensions to carry off the storm water in an efficient manner they require to be made so large that instead of sewers they are small covered canals, the construction of which is very costly and which have the disadvantage in summer, when there is only a small quantity of sewage flowing in them, of becoming huge reservoirs of sewer gas, which discharges into the atmosphere most offensive odours. It is impossible to keep sewers of this kind clean. It is essential, therefore, that no attempt be made to dispose of the tropical rains by underground sewers which carry sewage, but that separate storm water channels be provided and separate sewers. A compromise is sometimes made by which the sewers are made larger than is absolutely required for the sewage, and the first flow of the storm water is admitted into the sewers, after which, by mechanical contrivance, no more is admitted, but the rest is diverted into the storm water channels. The object of this is to take to the sewers the foul washings from the roads, which would otherwise be taken into the storm water channels.

At this stage I think I may give you a short account of the manner in which Georgetown, the capital of British Guiana, is drained. The city is on the bank of the tidal River Demerara where it enters the sea, and is on perfectly level ground which is below the level of high tide. All the better class houses are provided with water closets, which drain into cesspits, made either of an iron tank of 400 gallons capacity, placed under ground, or of cement pits; while among the lower classes there are privies over open cesspits. These cesspits are periodically emptied by means of a large hose attached to a large barrel cart. A pump attached to the cart sucks up the contents, and any offensive gases are burnt by passing through a small fire on top of the barrel. The cart proceeds to a wharf at the mouth of the river, and the contents are thrown into it at the ebb tide and so swept out to sea. All the public institutions, such as the jail, public hospital, and almshouse, and a small district of the city, use pails, which are removed every night in carts and emptied into the river at ebb tide.

The storm water and sullage water go into open trenches, a greater part of which are lined with cement, and empty into large sluices, the doors of which are opened when the tide begins to fall. There are practically no sewers in the town.

The orphan asylum, having a large amount of land about it, disposes of its sewage by burying it in shallow trenches, and pasture grass then grows over them.

Of the systems of drainage in vogue, two only, the ordinary gravitation and the Schone system are worthy of consideration.

In both the water closets are used. Sometimes the drains and sewers are only used to convey from the privy the urine and ablution water, but as these are as much sewage as the solid matter there is no advantage in this separation. It may, however, happen that a population has to be dealt with who will not use water closets or who will ill-use them; and then the dry conservancy has to be used for the fæces, while the urine and privy washings pass into the drains. In these cases often the privy floor slopes, the solids being retained and the liquids flowing into the drains. When water closets can be used they should be introduced, but they should in the Tropics never be introduced into houses as in Europe. They ought invariably to be separated from the house, and if the house is more than one storey high, the closets can be approached

from the several storeys of the house by an open verandah. This should never be neglected, for water closets in the house in the Tropics invariably cause ill-health, owing to the fact that in the rains no traps or ventilators yet devised prevent sewer gas at times getting into the house, and during the hot weather decomposition goes on so rapidly in the sewers that there is always danger of the escape of sewer gas into the house. With the proviso that the water closet should be outside the house, it is undoubtedly the quickest method of getting rid of the sewage with the least nuisance.

There is no need of entering into the requisites of the drainage or sewage system. These are the same in the Tropics as they are in England. They must be regularly flushed and cleansed and properly ventilated, and they must carry the sewage quickly to the outfall so that it can be disposed of in as fresh a condition as possible.

The Schone system of sewerage is well adapted for those towns of the East which have very little fall, and this is the condition of most of the towns in the deltas of the great rivers. The places are absolutely flat and badly adapted for the introduction of the gravitation system. It is under those circumstances that the Schone scheme is valuable. It consists of a central station at which compressed air is stored and distributed by wrought iron pipes to ejectors placed in chambers in different parts of the sewage system. The sewage is conducted to these ejectors by ordinary gravitation pipes, and when they are thus filled the compressed air is admitted and ejects the sewage through pipes leading from the ejectors to the outfall. Rangoon, Kurachi, and some parts of Bombay are thus drained, and the system appears to be most successful.

(*To be continued.*)

THE "TABLOID" TRADE MARK.

We congratulate Messrs. Burroughs, Wellcome & Co. upon coming through the trying ordeal of a Court of Justice in which the firm successfully proved their right to the word "Tabloid," and all the trading privileges the exclusive right of using the word entails. The judgment was given by Justice Byrne on December 14th, 1903, at the High Court of Justice. The Judge stated that he had to deal with an action to restrain passing off goods not of the manufacture of Burroughs, Wellcome & Co., as or for their goods, and particularly from selling or offering for sale any such goods under the name "Tabloid" or "Tabloids." The desire of Burroughs, Wellcome & Co.'s opponents was evidently to expunge the trade marks in question from the Register, in fact to claim that the word "Tabloid" was not a specific term but a word in common use in the language. It was proved exclusively that the word was brought into use by the well-known firm at a certain date, and had ever since exclusively meant the products of Burroughs, Wellcome & Co., and that any use of the word by other firms to serve as a description of any form of compressed drugs was not legal. It seems the word "tablet" is as old as the days of Bacon. Tablet is defined by Johnson as "a medicine in square form," but search for the word tabloid at any time previous to 1884 was futile.

This judgment will be welcomed by the medical profession and by all who are really interested in pharmacy. The use of the word "Tabloid" represents but the emblem or trade manifestation of Messrs. Burroughs, Wellcome's work. Their real work can be seen in their laboratories, not in the showroom; investigation into the nature of drugs and their action is the secret of their success, not merely the form in which the medicine is put in the market. We have too few investigators in this department in Britain and it would have been a calamity to scientific pharmacy had the enlightened course this firm has adopted been in any way even discouraged or checked.

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THE

Journal of Tropical Medicine

December 15, 1903.

TROPICAL DISEASES DURING 1903.

Two important additions to our knowledge have been made during 1903. Two of the most deadly diseases known to man, namely, plague and sleeping sickness, have been investigated more closely and we have gained considerably in our knowledge of both. Dr. W. J. Simpson's observations and experiments in plague in domestic animals, whilst engaged in plague work in Hong Kong, have revolutionised our ideas in regard to plague infection, and taught us that in a plague-infected district animals are liable to plague to so great an extent as to render the eradication of the disease a most difficult matter. Hitherto it is to rat infection that attention has been almost wholly directed, but in view of recent observations the rat may play but a minor part in the spread of plague. Clemow, some time ago, showed that the marmot in Siberia was subject to plague, and that persons who came in

contact with this animal were more liable to the disease than their neighbours. We knew also that in Naples the bats were found infected with plague bacilli, and we have ever since 1894 been acquainted with the fact that both rats and mice are readily infected. Simpson, however, has shown that calves, pigs, sheep, fowls, ducks, turkeys, &c., acquire plague when fed on plague cultures or when given the organs of animals dead of plague to eat. The most alarming feature of the infection of animals would seem to be the fact that they may have plague and yet show no signs or symptoms of the disease. A pig may have a temperature of 104°, a fowl may have a rise in temperature to 106° and yet in neither case does the animal show any signs of ill health. Plague in animals is a more chronic disease than in man, and the excreta of these animals impregnated with plague bacilli pollutes the soil and their environment. The infection of birds is a most alarming observation, as by their excreta the bacilli of the disease can be spread broad-cast.

In regard to the treatment of plague the most important work has been reported also from Hong Kong, where carbolic acid in daily doses of 144 grains have been given with apparently good effect. The heroic dose of this drug is a therapeutic innovation of startling novelty; in one case Dr. J. C. Thomson gave 2,500 grains of the acid before the bacilli of plague finally disappeared from the blood.

The subject of trypanosomiasis and sleeping-sickness, for they must now he regarded as one subject, has occupied the attention of parasitologists and clinicians during the past twelve months. The discovery of the trypanosoma parasite in the cerebrospinal fluid of sleeping-sickness patients in Uganda by Castellani, duly announced in this Journal on June 1st, 1903, and August 1st, 1903, marked a new era in the study of the disease. The carefully recorded pathological findings in the disease by Dr. G. C. Low, who accompanied Castellani, and the epidemiological observations of Dr. Christie, have also contributed greatly to our knowledge.

Castellani's work has been confirmed by Lieut.-Col. David Bruce, who also worked out the relation of the tsetse fly to the spread of the parasite and the disease it would appear to cause. In 1902 the fact that the human subject was liable to infection by the trypanosoma was announced by Forde and Dutton, and the condition called trypanosomiasis in man was recognised as a specific ailment. The reason why Europeans did not pass into the stage of sleeping-sickness, although infected with trypanosoma, was attempted to be explained in several ways. Some assumed that the white and coloured races were attacked by different species of the parasite, others that the reason of the differentiation was due to ethnical causes. Manson, however, has recorded a case of trypanosomiasis in the *British Medical Journal* of December 5th, 1903, in a European, which developed into sleeping-sickness some two months before death. This important observation serves to complete the clinical continuity of these diseases and to break down the preconceived notion that trypanosomiasis in Europeans and sleeping-sickness in the natives of West and Central Africa were separate ailments.

Reprint.

SLEEPING SICKNESS AND TRYPANOSOMIASIS IN A EUROPEAN: DEATH: PRELIMINARY NOTE.

By Sir Patrick Manson, K.C.M.G., M.D., F.R.S.
Lecturer London School of Tropical Medicine, &c.

Dr. Daniels, late Superintendent of the London School of Tropical Medicine, and I recorded a case of trypanosoma fever in the *British Medical Journal* of May 30th of this year. At that date the patient had left hospital for some time, but I occasionally heard of her progress. About two months ago suspicious drowsiness was reported. This gradually became more pronounced and she died with marked symptoms of sleeping sickness on November 26th, two years and three months after the presumed date of infection. At the necropsy and subsequent histological examination of the brain unequivocal evidence of sleeping sickness was obtained.

Considering that this is the first well-authenticated case of sleeping sickness in a European, that it affords almost conclusive evidence that the trypanosoma is, to say the least, an important factor in the etiology of this terrible disease, and that the subject is deservedly exciting much interest, I feel justified in offering this

preliminary note for publication. In due course further clinical particulars, together with a detailed histological examination of the brain and other tissues by Dr. Mott, F.R.S., and by Dr. Low, of the London School of Tropical Medicine, will be forthcoming.

The leading facts are briefly as follows :

About August 14th, 1901, the patient, the wife of a missionary stationed at Monsembe, Upper Congo, was bitten on the left leg by some animal, presumably a tsetse fly (? *Glossina palpalis*). The bite inflamed, and a fortnight later she had the first of a long series of recurring attacks of fever. About the same time a peculiar patchy and ringed erythematous eruption appeared on the skin ; and the spleen and liver enlarged. She returned to England in December, 1901. In May, 1902, she had an attack of phlebitis in the left leg. On October 3rd. 1902. I saw her for the first time and diagnosed trypanosomiasis, a diagnosis subsequently confirmed by Dr. Daniels, who after long search found trypanosomes in her blood. She was in the tropical wards of the London School of Tropical Medicine for about five months. A number of futile attempts were made by arsenic, methylene blue, horse serum, and other means to destroy the trypanosomes. She left the hospital on March 27th.

On leaving hospital she went to the seaside and improved considerably. When again I saw her on May 5th, 1903, she seemed to be in fairly good health, bright and able to walk about, taking an active part in conversation, free from fever, and apparently much improved, although the erythema and parasites persisted. She then went to Cromer ; the weather there was cold and raw, and, she thought, had a prejudicial effect on her health. The attacks of fever became more frequent and severe, and her general condition rapidly deteriorated. She returned to her home at Bristol feeling weak and ill. About the middle of October, although able to get out of bed and walk from one room to another, her friends noticed for the first time a tendency to drowsiness. On this being reported, Dr. Low and I went to Bristol to see her. She was in bed, extremely weak, very much wasted, with a rapid pulse which she had had all along, and some fever ; the ringed erythema was still distinct. The trypanosomes were somewhat more numerous in the blood. She was emotional, but could converse for a short time intelligently, only when conversation stopped she would close her eyes and appeared to sleep. Her husband informed us that this soporose condition was somewhat less marked at the time of our visit than a few days before. The knee-jerks and superficial reflexes were present, the sphincters were under control, the pupils reacted normally ; there was no tremor, but there was a distinct twitching at the left angle of the mouth. Dr. Low, who had seen a great deal of sleeping sickness in Uganda, would not commit himself to a diagnosis, though we both regarded the case as exceedingly suspicious.

From that time the patient's condition gradually got worse ; drowsiness increased, conversation became confined to monosyllables, occasionally food was retained in the mouth for a considerable time before it was swallowed, the sphincters were no longer controlled, spasm of one arm occurred, bedsores formed, and she died comatose on November 26th.

Dr. Neild, University College, Bristol, kindly made a necropsy the same day. Macroscopic signs of chronic meningo-encephalitis—injection of vessels, and milkiness of the pia arachnoid—were found. Subsequently microscopical examination of brain sections by Drs. Mott and Low (whose preparations I have examined) revealed the extensive perivascular small mononuclear infiltration so characteristic of sleeping sickness.—*Brit. Med. Journ.*, Dec. 5th, 1903.

Translation.

THE TRYPANOSOMES IN HUMAN AND ANIMAL PATHOLOGY, WITH A DISCUSSION OF THE LITERATURE ON THE SUBJECT.

(*From the Centralblatt für Bakteriology*, Ed. xxxiv., No. 8.)

By Lydia Rabinowitsch and W. Kempner.

Translated by Eugenie Joachim (Mrs. Frank Gibson) and Kenneth W. Goadby, D.P.H.Camb.

We have proved by means of our experiments in immunisation that in addition to active immunity passive immunity may also be produced for the protozoan species. This fact has only recently been demonstrated, but in a minor degree, by Laveran and Mesnil for the nagana parasite, but for no other kind of parasite. Our own researches have therefore been, on the whole, confirmed by Laveran and Mesnil, as well as by Wasielewski and Senn, the latter having limited themselves to the study of the development of the trypanosome; and although we may have occasionally been in error in our explanation of some of the observations, especially concerning the matter of development, we must advance as our excuse the fact that the technique of Romanowsky's stain, which is absolutely necessary for developing forms, has not proved successful in our hands. Indeed we have only been successful with the modification of the above-mentioned stain, *i.e.*, that of Wasielewski and Senn, which is easy and practical, and we were also able at a later period to follow up the flagellum in its whole course, by means of Leishman's method, into the centrosome.

We must certainly admit that our former acceptance of a form of development without flagella cannot be considered correct. The development takes place during the actively motile stage, and is essentially the same in all our drawings, notwithstanding their small differences. The characteristic method of division is in the long axis, but nevertheless, the inconstancy of longitudinal fission does not exclude transverse fission, as in our former assertions. Besides the longitudinal division there is also the rapid formation of rosettes by multiple division. In this mode of division, however, the mother cell is no longer recognised as such : the researches of Laveran and Mesnil and of Wasielewski and Senn are contradictory, the former being correct.

Besides the study of rat trypanosomes which we have continued to follow up, we have been able, thanks to

the kindness of M. Nocard, to study the morphology and history of development of dourine, he having sent us two rabbits infected with the trypanosome. In our comparative trypanosome studies we were also in the position to study fresh nagana material, fresh and stained surra preparations from India, unstained caderas preparations from M. Nocard, stained and unstained preparations of Gambia fever direct from man (from Dutton), as well as new preparations of human trypanosomes, which were passed through rats and mice (from Dutton and Todd), as well as, lastly, stained preparations of sleeping sickness (from Castellani). We wish here to again thank all these gentlemen for their help.

Whilst this article was in preparation we received a parcel from Aufort containing caderas trypanosomes from infected guinea-pigs.

We must express our most grateful thanks to Professor Edmond Nocard, and Herr Lignieres, who have sent us the animals in such good condition, and in especially useful form for our researches. One of the animals which gave hardly any sign of illness had a great number of living and motile parasites in its blood that were identified as caderas trypanosomes; these we describe below. We observed in this animal adult parasites in the stained preparations. A guinea-pig was easily infected by inoculation subcutaneously as well as intraperitonally. After intraperitoneal injection we observed a few parasites on the second day, and more on the third day. In peritoneal fluid, obtained with a capillary tube, besides adult forms, parasites mostly in process of division, and generally with two, three, or four nuclei and the corresponding number of flagella were found, further multiple forms with division of the protoplasm, which just before segmentation showed eight to ten nuclei: the dourine and nagana showed similar results. We regret that we have not been successful with the staining of the basic granules in these preparations, so that we could at once give a picture of their behaviour during the developmental process. On the third day we could detect no parasites in the blood of the guinea-pig, and on the fourth day adult forms, and on the fifth developing forms were microscopically demonstrable. Concerning the results of our experiments, which at first mainly dealt with the development of the caderas trypanosome, and which were made in a similar manner to our experiments with the dourine and nagana parasites, we may be able to give more information later on.

We will now consider the morphology of the parasite. Koch says that the rat trypanosomes are somewhat larger and longer than the trypanosomes of Surra, and differentiates one from the other, inasmuch as the head end terminates in a beak-like projection, whereas the "head end" of surra parasite terminates obtusely; he says, moreover, that in South and East Africa and India, where he has observed the tsetse-fly and surra diseases, the parasite is practically identical. The formerly described head end is now generally recognised as the tail end of the parasite, and as the main morphological mark which distinguishes the rat trypanosomes from all others. In the latter, as well as in the human trypanosome, the tail ends more or less bluntly, although there are not only different kinds to be enumerated, but in some cases isolated transitional forms are observed in the same preparation.

Sometimes the tail end of this parasite shows a similar pointed appearance to that which is characteristic of the rat parasite. The different forms of the tail end are not so constant that we could detect therefrom the pathogenic from the rat trypanosome. The same is, according to our view, the case in the longitudinal measurement of the parasite. Koch thinks that, as we have already said, the rat parasite is longer than the nagana and surra trypanosomes, whereas Laveran and Mesnil, as well as Bradford and Plimmer, on the contrary, think that the tsetse parasite is the largest. The first note of March 29th, 1901, by Laveran and Mesnil, gives the measurement of the tsetse parasite as 30 μ, including the flagellum; their second notice November 17th, 1900, as 25 to 30 μ; their third, January 25th, 1902, in rats, mice, guinea-pigs, rabbits, dogs, as 26 to 27 μ; in horses and mules, 28 to 33 μ; we see from this diversity that the relative lengths do not give us any certain method of differentiation. Bruce also makes it a point that the nagana parasite varies in size in the various species of animal, whilst, according to Bradford and Plimmer, it is supposed not to show the variation mentioned in the various examples of the disease. The surra trypanosomes have hitherto been thought to be morphologically identical with the nagana parasite, while Laveran and Mesnil think that the latter is a little longer. Our own observations bring us to the conclusion that the length is no criterion, and that long and short forms may be found in the rat trypanosome, as well as those of man and other animals, can be found. We, too, like Koch, are more in favour of the slightly greater length of the rat parasite. Comparative measurements, however, show us that the apparent length of the rat parasite may be due to the greater diameter of the pathogenic species, caused by the undulatory membrane up to 1 μ in length.

A more probable difference, which has hitherto been little recognised, seems to us to be the position of the nucleus, which in the *T. Lewisi* is mostly lodged in the anterior two-thirds of the body, while in all other species it is in about the middle of the body of the parasite. These would be the main points in which the stained preparations of the rat parasite differ from other species. In the fresh blood it would be much more difficult to find any difference, especially as we do not attach much importance to the greater motility of the rat parasite.

What morphological differences are there to be found in the trypanosomes which cause the surra disease, nagana, dourine, caderas, and all the varieties of human trypanosomes we know? We can answer these questions, in short, from our comparative studies, that we could not confirm the constant morphological difference between the aforesaid trypanosomes. We speak firstly of the caderas parasite, which would justify us in drawing conclusions as to the difference in species. We likewise failed to observe special forms or structural

differences in the preparations of Castellani and Dutton, other than those we have also observed in the animal trypanosomes: the more or less obtuse form of the hind part, the precipitation of the chromatin, the granulation of the protoplasm in or about the vacuole, the more or less clearly visible juncture of the outline of the edge with the centrosomes. Whether such combination exists it is difficult to say; all these morphologic and isolated facts may be observed in one and the same specimen. We therefore think that a differentiation at present of the species is impossible.

It is different with the caderas parasite, in which the centrosomes are almost half the size of those of all other trypanosomes, and which are difficult to stain, so that former observers failed to notice them. Even in the recent work Elmassian says that in place of centrosomes there is "Une boule refringente incolourable." Laveran and Mesnil first found, however, that a little chromatin was present and takes a red colour in their stains. The colour used is "Bleu Borrel eosine tannin," which stains the chromatin red and not violet. We were not so fortunate in our colouring, and saw even in the same specimen clear and stained centrosomes, whereas in other preparations well-stained parasites showed no trace. We may mention here that there are numerous granules to be found in the protoplasm of the body of the caderas trypanosome which take up the stain. On the whole, therefore, the form and staining reactions of the caderas trypanosomes do not differ much from those of other pathogenic trypanosomes.

The small size and difficulty with which the centrosomes stain are therefore morphologically the only differences of the caderas parasite from the other species. It will be seen that it is almost impossible to morphologically separate the different pathogenic species.

We were also in a position to follow up the development of the trypanosomes in the dourine and nagana. The mode of division can be characterised just as in the *T. Lewisi*, as generally a longitudinal division, with the difference that the division in these pathogenic species is more constant. The different stages of division do not generally show such varied forms as the rat trypanosome, inasmuch as a multiple stage of fission has not been observed, but we have been able, in the case of the dourine as well as in the nagana parasite, to establish a multiple division of the mother cell which leads to the formation of rosette bodies.

Schneider and Buffard have already noted such a condition in the dourine parasite, whereas we cannot find the condition anywhere described in the literature for the nagana trypanosome.

Corresponding with the comparatively small number of parasites which are microscopically visible in the examination of animals infected with dourine, we have only rarely been able to observe the fission of the dourine parasite. We have, however, come to the conclusion that the cycle of fission takes place in a similar manner to that of other pathogenic trypanosomes but in a more simple manner. However, like the *T. Lewisi*, whose developmental cycle we described for the first time, so also in the trypanosome of German marmots, it is possible that the same process of division exists. We saw in one of Castellani's preparations of the trypanosome of sleeping sickness pear-shaped young forms, such as have been observed in other trypanosomes. Furthermore, we have seen the same developing forms that are seen in all other species in preparations of the human trypanosome after passage through the bodies of animals.

From the above we think that we may conclude that a classification of the various species is not possible on a developmental and morphological basis, and that in differentiating between them we must take into account the biological differences. Indeed, it has only been possible through immunisation experiments to determine that the parasites of the surra, nagana, dourine and caderas represent different species. Animals which have been immunised against one of these diseases always prove susceptible to the others. This difference of species has been proved by Nocard; the difference of dourine and nagana from the mal de caderas was proved by Lignieres, whereas Laveran and Mesnil, by alternate immunisation and infection, have made the division of the surra, nagana and the mal de caderas parasites possible.

Among other things relating to these experiments; it was proved that rats which were actively immunised against *T. Lewisi* were still susceptible to the dourine parasites; on the other hand, some animals (rats) which recovered from dourine infection proved refractory to the *T. Lewisi* (in this connection see experiments on German marmots).

It seems, also, almost impossible to divide up the above-mentioned trypanosome species by their relative pathology and virulence, as the susceptibility of various animals of one species is different for the same kind of trypanosome, and is, moreover, subject to great fluctuations.

We know of no micro-organism which produces the same pathological reaction in all animal species; furthermore, we must also mention the fact that the pathogenic trypanosomes possess in a very high degree the power of adapting themselves to the tissues of their host. This has been proved without doubt in the case of the nagana and dourine parasites through work partly conducted in Africa and partly in Europe. Thus, for instance, dourine parasites which were virulent for mice and rats lost their virulence after passage through dogs (the parasites came to us in infected rabbits), so that it only became possible to infect white rats after ten-fold passage. Perhaps it will be possible in time by means of proper cultivation methods to form a classification of the various kinds of trypanosomes, especially as Novy has succeeded in so doing with the *Trypanosoma Lewisi.* This method of Novy's can certainly be regarded as a possible solution, as we have been able to confirm the fact by experiments with the *T. Lewisi.*

In what general relationship, therefore, do the human and animal trypanosomes stand to one another?

We can only advance conjecture concerning this, as we have so far only the short report of Dutton and Todd. Should it be shown, however, that the trypanosome of sleeping sickness of Castellani is being

spread by the tsetse-fly, as Brumpt is inclined to think, it would be possible to assume a near relationship between this trypanosome and that of nagana. Further researches will bring this to light. Perhaps it will be shown that just as the Anopheles is able to transfer the three kinds of malaria parasite to the human being, so perhaps the tsetse-fly, or some other blood-sucking fly, will be shown to carry the various forms of human and animal trypanosomes with a fortuitous development contrasting with that of the malaria parasites.

The biological proof of the difference of the various trypanosomes may be proved, as Nocard and Lignieres, and also Koch, have shown that inoculation through the puncture of a mosquito infected with one variety of malaria parasite does not produce immunity against other malarial parasites, a fact which dispelled the presumption that the various malaria parasites were one species.

Reviews.

STUDIES IN LABORATORY WORK. By C. W. Daniels, M.B., M.R.C.S., late Medical Superintendent of the London School of Tropical Medicine; Director of the Institute for Medical Research, Federated Malay States. London: John Bale, Sons and Danielsson, Ltd.

This is no ordinary work. The author in his Preface states his object in publishing it was to assist practitioners in the Tropics in the application of laboratory-methods to the practice of medicine. Dr. Daniels is eminently qualified for this purpose. His name is well known as that of one of the highest authorities in the matters of which he treats in this volume. The opening chapter at once shows that our author appreciates the difficulties in laboratory work in the Tropics, and clear common-sense directions are detailed how to cope with them. The apparatus recommended is reduced to its simplest proportions, and clear and explicit directions given how to keep everything in good order. The essential points concerning *post mortems* in the Tropics are then narrated, and Dr. Daniels then passes on to the preparation of specimens for microscopical examination. The chapter on the examination of the blood is one of the best in the book, the various methods of examining fresh blood, or of dried films of the same are minutely given. The different forms of the corpuscles found are illustrated by beautiful plates. Next are considered the various forms of animal parasites found in the blood, and the best methods for their examination; the cycles of the malarial organism are portrayed by an excellent diagram, and the whole subject of its life history exhaustively treated, whilst the same thoroughness characterises the treatment of the other blood parasites, the section on filaria being particularly excellent. The chapters relating to mosquitoes embrace the whole subject, and here Dr. Daniels has enlisted the aid of Mr. Theobald, of the British Museum, in the description of their anatomical properties. How to demonstrate the development of malaria parasites in mosquitoes is then described. The important subject of examination of the fæces in the Tropics is most exhaustively treated—first, the various naked-eye appearances are noted, and then the microscopical examination. Excellent drawings of the various ova met with are given with the description of the same, and the numerous mature worms receive full recognition. After the description of the fæces and its organisms comes that of the urine. The chapter on bacteriology contains a vast amount of useful information, by the observance of which the inherent difficulties of this subject in the Tropics will in a great measure be avoided. The work concludes with the subject of measurements of the various eggs, parasites, normal and abnormal cells.

In this brief review we have tried to indicate the large amount of ground Dr. Daniels has traversed. Those who worked under him lately at the London School of Tropical Medicine will welcome this work of their old teacher, whilst those who have not had this advantage will find in the book before us an excellent, though not an equal, substitute. It has been, we have noticed, in the reviews of medical books, often the custom to see the book under review described as "supplying a long-felt want." We venture to repeat this well-worn phrase with respect to the volume we are noticing, but not in its usual perfunctory manner. At any rate it is indispensable to any worker on tropical disease.

BACTERIOLOGY OF MILK. By Harold Swithinbank and George Newman, M.D., F.R.S.E., D.P.H. Publishers: John Murray, Albemarle Street. 1903. Price 25s.

It is with very great pleasure and profit we have perused Mr. Swithinbank's and Dr. Newman's book on the bacteriology of milk. It is a work unique of its kind in this country, and one which is much required, both in Great Britain and the Colonies. The volume consists of 605 pp, comprising 15 chapters, 20 appendices, 68 illustrations, 4 charts, and an excellent index. It is a treatise not only on the bacteria found in milk, and the methods of their detection, but also on the risks to which milk is likely to be subjected under varying circumstances, and the control exercised by different States, by private enterprise, and by the trade, to reduce these risks. The information set down is derived from many sources, the aim of the authors being to systematise the bacteriology of milk. In this there can be no doubt they have been very successful, and they have brought together data which will be invaluable to medical officers and others interested in the purity of the milk supply, and in the prevention of disease caused by milk which may happen to be diseased or contaminated.

One of the most interesting chapters is that on the bacterial contents of milk. Even under normal conditions the bacteria in milk of towns reach a very high figure, many town milks containing hundreds of thousand and even millions of bacteria per cc. There is always, however, an immense difference in the numbers of bacteria in milk obtained under good conditions

of the byre, clean vessels, and clean handling, and those obtained under opposite conditions. Park's experiments in New York are given, as well as the results of different investigators on the Continent. The authors also add the result of their own researches, which conform more or less with those of Park's; 30,000 organisms per cc. is the standard of bacterial purity set up by the Philadelphia and New York Milk Commissions; 50,000 organisms per cc. is that fixed on by others. These seem to be far from erring on the side of possible purity, but when compared with the numbers of bacteria per cc. in the samples quoted by Dr. Newman and Mr. Swithinbank, we may feel thankful if such suggested standards are ever attained. We note that in a good-class milk shop in the city of London there were in one sample examined 4,800,000 bacteria per cc., of which 120,000 were liquefying organisms. The temperature of the milk has a great influence on the increase of the bacteria, and it is pointed out as an important fundamental fact that to refrigerate milk as soon as it is drawn from the cow is at once to check the increase of bacteria; as the authors remark obviously, such treatment is but one step short of radical, and in cases where the dairying from beginning to end is conducted with strict cleanliness and the milk is derived from healthy cows, such refrigeration is ample protection. But where these conditions are not fulfilled the only safe course is in sterilisation, or Pasteurisation, of the milk.

Pathogenicity or virulence of milk is also discussed with regard to temperature, and it is shown there is an increase with the rise of temperature. There are chapters on the pathogenic bacteria of milk, more particularly with reference to tuberculosis, scarlet fever, typhoid fever, diphtheria, throat illnesses, and epidemic diarrhœa. Valuable summaries are also given of a large number of epidemics caused by infected milk, the signs and characteristics of milk epidemics are set forth, their mode of investigation is dealt with and the modes of prevention are explained.

The book is a sign of the awakening interest to the dangers to which the public are exposed by the present unsatisfactory—one might say almost barbarous—system of dealing with the milk supply. It points out those dangers in a clear and interesting manner, and the authors are to be congratulated on the production of very useful and practical, as well as scientific work, on milk and the milk trades, from a health point of view.

PROPHYLAXIE DU PALUDISME. By Dr. A. Laveran. 209 pp.; 3 frcs. Paris: Masson et Cie.

The fact that Dr. A. Laveran, the discoverer of the malarial parasite, is the author of this compact yet comprehensive work, is a guarantee of its excellence. Dr. Laveran divides his book into two parts. Part I. is entitled, "The *role* of Mosquitoes in the propagation of Paludism." Chapter i. deals mainly with the varieties of the malarial parasites met with in the blood, with the history of the part played by mosquitoes in the propagation of the disease, and experimental proofs of the correctness of the theory. Chapter ii. discusses the Anopheles and the position it assumes in malaria, replies to the objections raised in regard to Anopheles being the host of the malarial parasites, and mentions the frequency of malarial infection in young children of malarious regions. In chapter iii. the author describes the culicidæ, gives an account of their biology, and of the species of anohpeles met with in Asia, Africa, America, and Australasia, and devotes some pages to the technique required for studying the culicidæ. Part II. is entitled, "Prophylaxis of Paludism." Chapter i. deals with the destruction of mosquitoes by the plan of filling up stagnant pools, drainage, culture of the soil, and other well-known methods, as well as the extermination of the larvæ by fish or larvæ of certain insects and the imago by other means. Chapter ii. relates to personal prophylaxis, and discusses the measures to be adopted to protect oneself from the bite of mosquitoes, the choice of a dwelling, mosquito nets, the systematic protection of the dwelling by means of wire netting, with a description of the practical method of employing it, the mechanical protection of persons who may be obliged to spend the night in the open air, and finally, a list of ointments, volatile essences, and other substances said to keep off mosquitoes. Chapter iii. is chiefly devoted to the preventive use of quinine; the several doses recommended by various authorities are quoted, and the necessity of cheap quinine insisted upon. Other drugs said to be prophylactic are also mentioned, and the possibility of acquiring immunity from paludism is discussed in all its bearings. Chapter iv. shows how advancement in civilisation and hygiene, such as better built habitations, more wholesome food, purer water and individual hygiene tends to decrease the incidence of endemic malaria, and points out that a constitution enfeebled by a tropical climate is liable to be invaded by paludism.

The book, though small and concise, is eminently practical, and should be a valuable addition to the library of medical men in the Tropics and Sub-tropics.

Notes and News.

ADDRESS BY SIR PATRICK MANSON, K.C.M.G., F.R.S., AT THE LONDON SCHOOL OF TROPICAL MEDICINE.—On December 7th, Sir Patrick Manson gave an address at the London School of Tropical Medicine on the work the school has done, is doing, and hopes to do. Admiral Sir R. More-Molyneux occupied the chair. The occasion was the departure of Sir Francis Lovell, the dean of the school, who is about to undertake a mission to the far East in behalf of the funds of the school. Sir Patrick referred to the good that Mr. Chamberlain had done in founding and furthering the objects of the school. He acknowledged the public spirited manner in which the Seamen's Hospital Society had provided the means whereby the teaching of Tropical Medicine in London was rendered possible. The achievement accomplished by the students and those connected with

the school were then specified; the great help the school had received from Sir John Craggs was cordially acknowledged; and the devotion of Sir Francis Lovell to the cause of Tropical Medicine referred to in a complimentary manner. A vote of thanks to Sir Patrick Manson was proposed by Sir William Church and seconded by Sir Frederick Young. We hope to publish Sir Patrick's speech in our next issue.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Guinea-worm.

The Life Span of the Guinea-worm. By Arthur Powell, M.Ch. *The Indian Medical Gazette*, Nov., 1903.—A party of twenty-one persons from Bombay visited Mahad on April 20th, 1902; they remained at Mahad two days, drinking unfiltered water from the local well. On April 3rd, 1903, almost twelve months later, one of the party developed a guinea-worm in the leg. A second member showed a worm on May 1st, 1903, and in five other members of the party guinea-worm appeared between May 1st and 20th, 1903. Up to October 3rd, 1903, no other member of the original party showed signs of being infected by the worm. In those infected no worms appeared after July, 1903. These observations indicated that the majority of worms appeared in a year and two or three weeks after infection, and that the egress of the worm occurred between the 345th and the 435th day. The possibility of the infection having occurred at Mahad is rendered probable by the fact that infection in the city of Bombay is well nigh negative, whereas in Mahad it appears that during 1903 half the population suffered from guinea-worm.

Malaria.

For acute malarial fever Dunn recommends a pill like the following thrice daily; in chronic fevers a pill may be given every four or six hours:

℞	Methylene blue,	gr. ii. or iii.
	Ferri carbonat.,	gr. i.
	Quinin. sulphat.,	gr. ii.
	Acidi arseniosi,	gr. $\frac{1}{50}$.

—*Clin. Rev.*, December, 1903.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

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2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

THE

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EDITED BY

JAMES CANTLIE, M.B., F.R.C.S., AND W. J. SIMPSON, M.D., F.R.C.P.

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Original Communications.

COLD WEATHER MOSQUITO NOTES FROM THE UNITED PROVINCES—NORTH-WEST INDIA.

By Lieut.-Col. G. M. Giles, I.M.S. (Retd.).

It is only after leaving the "Land of regrets" that the Anglo-Indian begins to discover that there are many points in its much abused climate that go far to compensate for the bad ones, and the awful "summer" we have just undergone in England, left me with a keen desire to avoid a winter to match, that I found the East calling so strongly to me, that it became imperative to put myself eastward of the limits of longitude, wherein, according to Kipling, the twelve commandments alone have force, so I took me a ticket for Bombay and landed there on November 14th, to find it as steamy and odoriferous as ever, and even more objectionably European townish than when I left it. Avoiding any longer delay than that involved in buying a new solah topee, I sped northward to my old province and am now camping about in one of the northern districts of the dear old North-West provinces, where for some five months in the year the climate, to my taste, is one of the finest in the world.

At this time, in the middle of November, it may be a shade too warm in the middle of the day, but the dry, clear air and bright sunshine are most enjoyable after the miseries of gloom, rain and tempest we have been having in England, and at night one is glad of several blankets.

The following notes refer, it must be remembered, to tent life, our camp being usually pitched in the shade of the large mango groves which are plentifully dotted over the country, so that such mosquitoes as are observed must consist of individuals living under sylvan rather than domestic conditions, though the mosquitoes met with are generally of the same species as those found in houses at the same season.

Mosquitoes of several species are fairly numerous, but in no way troublesome, the cold at night probably indisposing them to bite, as out of a large number of specimens I have met with, only one or two were taken that had recently bitten. The sand flies (*Phlebotomus*, sp.) on the other hand, not unfrequently attack one in the dusk, but they are not very numerous. At our first camp the only species taken was *C. sitiens*, Wied., the males being six or seven times as numerous as the females. One of the characters generally given for this species is that the hind tarsi are unbanded, but after examining a large series I find this character is extremely variable, some of the males having very distinct yellow basal bands, and some signs of banding being perceptible in almost all. In many females, on the other hand, no banding of the hind legs can be made out, and though there is always perceptible banding of the fore and mid tarsi, the breadth of the bands varies greatly in both sexes.

At our next camp we stopped for three days, and it was noticeable that the number of mosquitoes taking shelter for the day in the tents increased each day, and this although, from 7 to 9 a.m., scarcely a single specimen could be seen. About the latter hour they began to drop in each day, in steadily increasing numbers, to seek shelter from the heat of the sun. Two additional species here made their appearance, *C. fatigans*, Wied., and *Myzomyia Rossii*, Mihi. Of the former species, the males and females were about equally numerous, but in the case of the latter the females greatly preponderated in the proportion of at least twelve to one.

Out of a considerable number, taken from time to time in the tents, however, only two or three appeared to have attacked us, though they were evidently more ready to do so than the far more numerous *Culices*.

In this species I met with another striking example of variation. Curiously enough the very first specimen of an Anopheline taken by me this year appeared to belong to a new species, and it was only after taking a considerable number of specimens that I satisfied myself that it was nothing more than a dark-winged variant of *Myz. Rossii*.

The whole wing it will be noted is much darker than

in typical specimens, the first and third pale intervals of the anterior margin being barely noticeable on the costa, though wider on the 1st longitudinal. The characteristic T-shaped spot has the foot of the T extended into the 2nd longitudinal and there is an additional dark spot on the first, at the internal end of this spot. Lastly, the internal fringe on the markings of which so many specific distinctions are based is entirely dark except at the apex of the wing where the markings are fairly normal.

Wings of Normal Myzomyia Rossii ♀ contrasted with that of a Dark Variety of the Same Species.

Now, I think there can be little doubt that had this specimen reached us as a solitary female, from some out of the way locality, it would undoubtedly have been described as a new species as the differences are certainly far greater than those, for example, which distinguish the members of what may be called the *Culicifacies*' group.

Further, in this curious specimen, the two wings are not exactly alike and the venter of the last three abdominal segments have a considerable number of flat scales towards their hinder borders.

On examining the small series of specimens of this species collected within the last few days, considerable differences in the relative length of the dark and light spots can be detected, and the internal fringe especially varies greatly in its markings. In one specimen, almost the whole of it is pale inside the junction of the 5th longitudinal and the width and the sharpness of definition of the dark and pale portions vary greatly. So also do the breadth and sharpness of the tarsal bands.

A character, however, not, I think, hitherto noticed, which appears constant are certain markings of the ground colour of the venter. The general colour of this is a deep slate colour, and the 3rd, 4th, 5th and 6th segments each show a pair of basal pale testaceous spots of conical form, and a short median line on their apical half. These markings are specially sharp and well contrasted in the ♂, but are also quite distinguishable in the ♀.

The moral of these remarks is that the descriptions found in systematic works should not be read too absolutely, and that one should be always prepared to meet with considerable variations from the type.

That it is quite impossible to draw up, within any moderate compass, a description that will meet the case of all variations even when these are known to us, may, I think, be sufficiently obvious from the space occupied in discussing the variations of the two species noticed in the present article.

To be continued.

A NEW FILARIA IN A MONKEY.

Communicated by George C. Low, M.B.
Superintendent London School of Tropical Medicine.

In a letter received from Dr. Philip H. Ross, Government Bacteriologist in Uganda, this observer reports the discovery of a new filaria in a monkey. To quote from the letter, he says :—

"I am also sending a filaria from a monkey. I have measured three specimens.

"*Specimen* 1.—Length, 200·4 μ; break in the continuity of the cells from head, 41·75 μ; V spot from head, 66·8 μ.

"*Specimen* 2.—Length, 175·3 μ; break in cells from head, 30μ; V spot from head, 50 μ.

"*Specimen* 3.—Length, 200·4 μ; break in the cells from head, 28 μ; V spot from head, 66·5 μ.

"As far as length goes, then, it corresponds fairly closely to *Filaria Demarquaii*."

Along with the letter I received a specimen of the filaria on a blood slide. There are plenty to be seen in the specimen, and they can easily be picked up with a low power. With a high power the embryos resemble almost exactly the embryos of *Filaria Demarquaii*. They have no sheath, have sharply-pointed tails, and their length and shape is apparently similar. There is a clear space at the head, then the nuclear column begins, and as it extends backwards fills the body cavity completely. The break in the continuity of the cells is well marked, but the V spot is difficult to determine in the stained specimens.

While in Trinidad in 1901, Dr. Ziemann, of the German Imperial Navy, showed me a filaria which he had found in the blood of a chimpanzee. Its main features were a very small filaria, with a blunt tail closely resembling *Filaria perstans*. As far as I am aware this new filaria found by Dr. Philip Ross has not been seen or described before. It is certainly different from the one discovered by Ziemann. I have no doubt Dr. Ross will write up the subject more in detail when he has had time to study this filaria fully. The

question of periodicity, the adult forms, and the intermediate host are all points of the greatest interest.

I propose that the name of *Filaria Rossii* be given to this new parasite.

CALABAR SWELLINGS ON THE UPPER CONGO.

By S. H. Habershon, M.D.

Sir Patrick Manson has kindly suggested to me that I should write a note on this condition. I sent him the case of the Rev. H. S. S., and I am able to confirm the fact that Mr. S. stated, that almost every European at Yakusu (a station on the Upper Congo) suffered from irregular and intermittent swellings on the arms, legs, and occasionally on the face. On one occasion, during an attack of malarial fever, Mr. S. was suddenly seized with sharp burning pain in the forearm, followed a few hours later by what he described as "a swelling of the muscle." From the description I do not feel certain that there was any œdema, but a ring-like swelling and enlargement occurred almost encircling the arm. The attack passed off in a few days. The disease is said by Mr. S. to be peculiar to the Yakusu district. The place is very dry, and there are few mosquitoes. I have information that four other missionaries of the Baptist Missionary Society (one a lady) suffer occasionally from these attacks. There is usually no fever; but in the two cases (one of which I shall refer to) the disease is confined to one side of the body. In other recorded cases both sides of the body are affected.

The impression prevails that these irregular swellings are due to the *Filaria loa*, and this is based upon the fact that in the case of one gentleman (Mr. K. S.) the filaria was seen by several observers, and felt by himself to cross the conjunctiva. The same condition has been observed in a native. That this parasite is actually the *Filaria loa* was confirmed by Dr. Argyll Robertson, who had the singular good fortune to have a patient (a lady from Old Calabar) brought to him at a time when the parasite could be seen under the conjunctiva. He was able to nip the conjunctiva with a pair of forceps in such a manner as to prevent the escape of the parasite, and with the aid of an assistant to cut down upon the membrane and extract the parasite. The case aroused much interest, and was thoroughly investigated at the time by Sir Patrick Manson. For the fullest information of all that is known about the *Filaria loa* the reader is invited to refer to the paper by Dr. Argyll Robertson in the Ophthalmological Society's journal for 1895. In this and other cases quoted by Dr. Argyll Robertson, swellings on the arms and legs also occurred. I shall refer to these later. A second case, the Rev. J. R. M. S., applied to me on his return from the Congo. His station is at Wathen, a district some 1,500 feet above the sea, and quite free from swamps. He had, however, on his first visit to the Congo in 1895, been sent to a damp and marshy district not far from the Stanley Falls, where he contracted malarial fever. He was frequently bitten by mosquitoes, and his febrile attacks commenced one month after his arrival on the Congo. In 1899 he had a more severe attack of fever, accompanied by hæmaturia, and a little later, after a second attack of fever, he passed urine of the colour of port wine (hæmatinuria). During the succeeding years occasional attacks of fever occurred, always yielding to quinine. I saw Mr. S. first in March, 1902. He was then in very fair health, without spleen enlargement. He was taking quinine freely, and I was unable to discover any trace of a malarial parasite in the blood. During the remainder of 1902 he improved in health, but suffered three times from malarial attacks.

In February, 1903, he first informed me that he was subject to irregular swellings of the left arm and thigh, which had existed for two or three years. They commenced with a most intense neuralgic pain (more commonly in wet or damp weather); the pain was followed by swelling in the part affected, commencing a few hours later, and comparable to an attack of acute myositis. Mr. S. came to me at the end of an attack (two or three days after the initial pain and swelling), and I was able to observe an enlargement in the forearm, localised, and some 3 inches in width, extending round the arm, but chiefly on the extensor surface. There was no lymphatic or other œdema. The pain and swelling was subsiding at the time.

I am writing to various members of the Mission on the Congo, and at a later date I propose to detail their experiences. At the present time Dr. Argyll Robertson, in response to a letter from me, has replied by sending me details of cases that he has seen that are of the greatest interest and importance, and with his permission I am able to publish his letter.

"18, Charlotte Square,
"Edinburgh,
"*December* 12, 1903.

"I have no manner of doubt that the two patients you had recently under your care, who had been resident on the Upper Congo, are cases of *Filaria loa*. The peculiar swellings on the arms and legs are, I am convinced, due to the irritation set up by the presence of worms at these spots. You will observe by the notes of the further history of my original *Filaria loa* case—of which I send you a reprint—that she suffered from similar swellings, which she attributed to the presence of a worm; also that worms had been noticed by her in her side, her left shoulder, under the skin of both hands, in the abdominal wall, and under the skin of the right breast. The filaria was successfully extracted from the last two situations.

"I have also more recently seen another patient, the widow of a missionary, who had been resident for some years at Old Calabar. She undoubtedly also suffers from *Filaria loa*, as the worm had been frequently seen under her conjunctiva (when in Old Calabar), and she had also observed them under the skin of her hands, wrists, breast, face and scalp. Two attempts to remove them had been made at Old Calabar—once from the side of the bridge of the nose and once from the back of the hand, but both were unsuccessful. She had also submitted in 1900 to an operation for the removal of a worm from the back of her hand by a doctor at Helensburgh, who observed the worm moving under the skin—but this was unsuc-

cessful. Another attempt was made by the same doctor to remove one from under the skin of the right forearm, but again unsuccessfully. I saw this patient in 1900 after the first operation, and again a month ago, but on neither occasion could I discover the presence of a worm. On the latter occasion she had felt the worm under the skin of her left cheek earlier in the day on which she called.

"There can be little question that in many cases, if not in all, there are several (if not many) worms present in patients affected with *Filaria loa*, and that the worms move freely and quickly about under the skin (whether in burrows or channels I cannot say). I have made careful enquiries as to water supply and food, the presence of insects, &c., but have failed to discover the probable source of the parasite. This last patient of mine resided while at Old Calabar always at Duke Town, where the water supply in the rainy season was from collected rain-water; in the dry season from a spring which was covered by the water of the river at full tide, and was very dirty. The drinking water was *always* boiled, passed through a 'drip-stone,' and filtered. But in the hot season she owned to having, while visiting the town, occasionally taken a drink of water not thus purified. Mosquitoes were not numerous, and she did not use mosquito curtains. She used no uncooked vegetables. Fruits taken were bananas, mangoes, avocada pears, oranges, pine-apples, 'sweet sop' and 'sour sop,' qranadilla and papaw.

"D. Argyll Robertson."

Finally, I may add that these observations of Dr. Argyll Robertson are conclusive as to the connection of these obscure swellings with the *Filaria loa*. There can be no reasonable doubt that the swellings are due to this cause. Further investigation will probably be directed towards the discovery of the origin of this disease and of the life-history of the parasite. I propose to do my utmost to elucidate this question.

CHOLERA ON ASSAM TEA GARDENS.

By William E. Lloyd Elliott, M.D.

The tea gardens of which I have had experience are those of the Assam Frontier Tea Company, situated in the province of Lakimpur, some fifty miles from Dibrugarh, the chief Government station, and the terminus of the lines of steamers running up and down the Brahmaputra and of the railway running into the tea district.

Two Types of Cholera.

The cholera met with is of two types, one of which, I believe, is universally held to be true Asiatic cholera, and another, which, though clinically indistinguishable, I maintain is not cholera at all, but is analogous to cholera nostras, or English cholera, and is due to ptomaine poisoning.

The First Type

is prevalent during the coolie recruiting season, which lasts from January—when the first batches begin to arrive—until the commencement of the hot weather in May. It is epidemic in character, and is brought by the coolies from their homes in far-off India, or is acquired by them somewhere on their journey through India and up the Brahmaputra; at any rate, it is very prevalent on the river steamers.

The coolies for the gardens we are concerned with land at Dibrugarh, and if they have a clean bill of health are sent on to their respective gardens; but if the way-bill is marked "cholera on board," they are detained in the segregation quarters, the sick for treatment, and the rest temporarily, and if these latter do not develop the disease they in their turn are sent on. These may carry the disease to the gardens, and, indeed, sometimes arrive ill at their destination, the disease having become manifest during the train journey. This is not as it should be, but the accommodation in Dibrugarh is limited, and the staff must be often unable to deal with the large numbers of coolies arriving, so that contacts are in some cases sent on prematurely to make room for new arrivals, and the coolies themselves conceal their illness, to avoid being left behind at the depôt.

On arrival on the gardens all infected batches are sent to the segregation lines and kept there for eight or ten days if no fresh cases occur. They are placed in small temporary huts, and any case occurring is isolated, and the contacts also put by themselves. All huts in which cases have occurred are burnt down, and all infected clothing, &c., destroyed. Sometimes fresh cases keep turning up in spite of all these precautions, making it necessary to move the whole camp to another isolated spot, and even this process may have to be repeated before the disease is stamped out.

Personally, I have never known the contagion to spread to the healthy coolie lines, or even to managers, medical attendants, nurses, &c., who may have come in contact with the sick, but it has been known to do so; and I have lately read an interesting private report from a medical friend (whose gardens were near mine), relating how a sluggish stream, flowing past several sets of coolie lines, became infected by some cholera-stricken new coolies, with most disastrous results, very many coolies dying, and the work of the garden being crippled for a considerable time.

The Second Type

is met with perhaps more often in the rainy or hot season, but it may occur at any time of the year. The cases are sporadic, and I have never been able to trace a connection between one case and another. They are brought into the ordinary coolie hospital, though for convenience a separate ward is kept for them. Their relations are allowed to visit them; and except that the stools are disinfected no special precautions are taken. They are brought in in a state of collapse, and with a history of diarrhœa; the stools are rice-water in character, and the cramps are usually severe. They seldom come to the hospital in the early stages, as it is only when they are discovered to be absent from work that the line chowkidars ferret them out and bring them in.

The coolies affected are, generally speaking, the physically finest, males predominating, and they are mostly young or in their early prime. Coolies of physically inferior races rarely suffer, and children and old people very rarely. In true cholera, of course,

this does not hold good. The stronger coolies earn more money, and so have more to spend on spurious articles of food and on liquor. Most of the cases come in on Monday or Tuesday, and they tail off towards the end of the week. Now Sunday is a holiday and the local market-day, and those who have money enough, or whose religion does not prevent them, indulge in drink, and in meat and fish supposed to be dried or smoked, but often so rotten as to be in a state of liquefaction internally. The stronger races, physically, belong generally to non-Aryan types, who have never been properly converted to Hinduism, and such religion as they have does not prevent their eating flesh or drinking intoxicating liquor. Very often on inquiry we find that the patient has been drunk the night before. I am told they pay so much to be made drunk, and they squat round in groups and drink until the desired result is obtained. They become wildly excited, and are correspondingly depressed afterwards. In addition to general nervous depression, or because of it, the functional activity of the digestive organs is impaired. The too often tainted meat or fish is not cooked as we understand cooking, but only scorched on the outside, or, in the case of dried fish, simply broken into the curry. So, if the organisms present are not destroyed by cooking, and the natural juices of the stomach are absent or diminished, the poor coolie stands a bad chance.

Another effect of drink is that the coolie sleeping late next morning, and waking with "a head," has neither time nor inclination to cook his food, and so he eats cooked rice or other food left over from the day before, which is anything but wholesome, especially in the hot weather: this is, I believe, one of the most fertile causes of this type of cholera.

Clinically, the two types of cholera are similar, the terrible cramps, rice-water stools, profound depression, cold, clammy skin, drawn features, ghastly pallor, and suppression of urine, being common to all cases.

Treatment.

The treatment is simple and mainly consists of trying to keep the patient warm; huge fires are lighted on the ground, or in large iron pans, the sufferer is covered with many blankets and packed round with hot bricks, the cramped limbs are rubbed under the blankets with powdered ginger and mustard oil. Sometimes a dose of calomel or castor-oil is given, sometimes not; but in all cases rum or whisky, or a stimulating mixture of ether and ammonia, is given. The almost imperceptible pulse is anxiously watched. When it begins to get stronger, and the skin to feel less cold to the touch, we have hopes; and when at last the patient urinates we know he is out of danger.

In comparing the two types, the most important point of difference which strikes one is, the river-borne or true cholera is much more fatal. In spite of all the care that is taken the case mortality is at or about 50 per cent. The mortality in the local cholera, however, varies, it is usually about 40 per cent; but by persistent drilling of the doctor babus and attendants, it went down to 30 per cent., and even a little lower on one garden where the babu was a very careful man and the number of hospital in-patients was small.

In making out the hospital returns, cases of ordinary diarrhœa were carefully excluded, and only those who came in in a state of collapse and exhibited the typical symptoms were included under the head of cholera.

Outbreaks Caused by Polluted Water.

1. The only outbreak of the Asiatic, or true cholera, type, affecting a tea-garden, and not directly attributable to the "new coolie" traffic, which came under my own notice, occurred in May, 1899, when the hot weather was commencing and the "new coolie" traffic was practically over.

Some native carpenters and smiths went from Debrugarh to erect buildings on a new garden situated on the banks of a tributary of a river which ran past two gardens under my charge. Both these gardens had a few huts on the bank of the stream, the main coolie lines being at some distance away.

Cholera broke out on the new garden, with several deaths. A body was reported to have been thrown into the stream, and subsequently cholera appeared in the little groups of huts mentioned, about eight miles down stream. It attacked old and young, without distinction of sex, and a large proportion of the inhabitants of these scattered huts suffered. The houses were not crowded together, each stood apart in its patch of garden; they were not specially dirty, and the one point in common was that the inhabitants drank water from the river. Later on I heard of cases in a village half a mile lower down, but only in huts near the river, the mischief not spreading to the main bazaar.

The number of cases which came under my care was not large, some five and twenty in all; but half of them died, and in several instances a husband infected a wife nursing him, or *vice versâ*.

It was a most interesting little epidemic in many ways, and I am sorry I cannot give exact details, but I find that all the hospital records out there have been unfortunately lost or destroyed.

2. Quoting from the private report before mentioned, I find that there were during March, April, May and June, 1902, on my friend's gardens, "116 cases of cholera, with 55 deaths." He attributed the outbreak to the infection of a stream by new coolies suffering from cholera acquired during their passage up the Brahmaputra. Further on he says: "Goorguri line cases first attracted special attention on account of their individual severity, and, for a time, invariably fatal termination. It was not clear at this time whether we had to deal with Asiatic cholera or a series of cases of vegetable or ptomaine poisoning. Clinically these cases are often indistinguishable, and the small number of cases in comparison to the period over which they extended, and the interval between occurrence, was against the outbreak being cholera (Asiatic)."

After describing the measures taken to prevent the coolies using the infected stream, the closing of village shops, methods of house disinfection, &c., &c., he goes on to say: "It was decided to establish a cholera camp, and about this time the cholera bacillus was detected microscopically."

This report shows that the "river steamer" cholera in this case at least was true cholera, and the death-rate, which was just under 50 per cent., accords with my own experience. I may say that the report quoted from was written for the information of the London board of directors of the companies owning the gardens, and through their courtesy I was enabled to see it.

A tea garden being private property, and the manager having absolute control of the native shops within its borders, it has been found possible to curtail the sale of objectionable food-stuffs; but the native bazaars, where the weekly markets are held, cannot be interfered with. In each of these is a drink-shop licensed by Government (they are farmed out to the highest bidder), and the spirit supplied varies considerably, there being several qualities, or rather strengths, to suit the coolies' pockets. Sometimes for short periods it has been found necessary to put the bazaar out of bounds, by keeping all the coolies on the garden, but it is an irksome process, and on many gardens would be impossible.

The bazaar drink-shop has long been a thorn in the side of the planter, and attempts have been made to persuade the Government to allow the tea companies to run them in the interests of the coolies, but hitherto without success. The Government, doubtless, has to consider the interests of all classes; but regulations providing for better police supervision on market-days would do much to remedy the grievance.

As I have before stated, the two types are clinically very similar; but a tea garden labour force being a separate entity, it is possible to distinguish between them by observing: (1) The mode of origin; (2) communicability; (3) the individuals attacked (age, sex, race), and (4) the case mortality.

Many Deaths Attributed to Cholera Probably due to Other Causes.

Reasoning from analogy, it would seem probable that many deaths all over India attributed to cholera are due not to true cholera at all, and that a proper inspection of food supplies and a little wholesome advice as to drink, diet, &c., would save many valuable lives amongst Europeans, not to mention the native side of the question, where caste prejudices would render control more difficult.

These notes refer to the period, 1896 to 1899, when bacteriological laboratories were, I need hardly say, unknown in Assam.

Note 1.—I have received an interesting account of the liquor traffic from Mr. J. J. S. Driberg, late Deputy Commissioner of Debrugarh and Commissioner of Excise for Assam. He tells me the Government demand a high price for the liquor licences in order to prevent the liquor being sold too cheaply, yet not so high as to encourage illicit distillation. The liquor is of good quality for "country spirit"; each licencee has his own still, which is periodically inspected; samples of the liquor are collected and tested, and the Government analysts in Calcutta have never been able to discover any deleterious ingredients, such as datura, cannabis indica, opium, nux vomica, &c., which some have supposed to be present, and the various qualities, sold at from 4 annas to 1 rupee a bottle, have been found to differ only in containing varying amounts of alcohol, ranging from 80 per cent. to 11 per cent.

The liquor is sold soon after manufacture, and is, of course, raw spirit, and no doubt contains distillation products, which at home we eliminate by maturing for some years, and the presence of which in raw whisky, rum, &c., is known to produce very severe forms of drunkenness.

Note 2.—I take the following from the *Assam Gazette* of May 20th, 1899: "In December, 1896, the Assam Government sent Lieut.-Colonel R. Neil Campbell, I.M.S., to make a full inquiry and report on the general conditions of the transit of emigrants in respect of sanitation, food and clothing. About the same time the subject was engaging the attention of the Lieut. Governor of Bengal, under whose orders Capt. Vaughan, I.M.S., was deputed on a similar inquiry.

"Many defects in the existing arrangements were brought to light, and valuable suggestions were made with a view to remedying them."

These suggestions are embodied in a series of regulations, following the above opening sentences; they are very full, and deal with the care of the coolie, in sickness and in health, from the time he leaves his country until he is safely landed on the garden of his choice.

MORPHOLOGICAL CONSIDERATIONS ON THE ANTERIOR EXTREMITY OF THE TRYPANOSOME.

By Dr. Jules Guiart.

Professeur Agrége of the Faculty of Medicine, Paris.

Publications on trypanosomes have been getting more and more numerous during the last few years, and specially during the last few months. One fact has struck me in studying these various publications, all the authors seem to have agreed to make the free flagellum the anterior extremity of the animal, most of them basing their statement on the fact that the trypanosome always moves with the flagellum directed forwards.

A comparative study of various flagellates had, however, led me to a conclusion exactly the contrary. I believed I was the only one to hold this opinion when I perceived, not without a certain amount of pleasure, and while reading again the very interesting work of Dr. Sambon on sleeping-sickness,[1] that the author had given expression to precisely the same opinion. But as he was unable to insist on that particular point in an article of a more general character, I venture to bring forward this modest contribution to the morphology of the trypanosome, to confirm the views of my able and learned colleague.

The *trypanosome* is a flagellate protozoal organism of a very elongated shape, more or less fusiform, presenting a large nucleus towards the middle of the body, and towards its rounded extremity a voluminous vacuole, and a small chromatic mass from which arises a long flagellum. The latter is at once folded back to constitute the free edge of the undulating membrane, which

[1] L. W. Sambon, "Sleeping Sickness in the Light of Recent Knowledge." Journal of Tropical Medicine, July 1, 1903.

extends to the other extremity. But, whilst the membrane is lost at this extremity, which generally ends in a rather sharp point, the flagellum continues in the same direction and constitutes a free flagellum.

From a comparative study of the trypanosome and various other flagellates, it would follow that the large vacuole represents the contractile vesicle, that the little chromatic mass is the centrosome, and that the extremity enclosing these is the anterior extremity, though contrary to the opinion of most authors. At least, it is what we shall demonstrate by starting from the more highly organised flagellates and arriving at the trypanosome, the organisation of which has been modified and simplified to answer to the needs of a more limited and narrow parasitism.

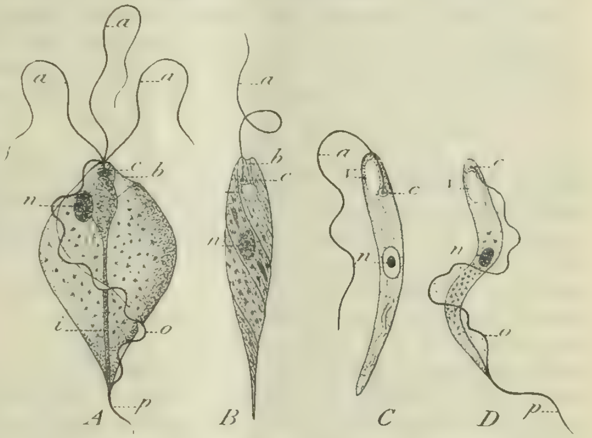
We shall take the *Trichomonas* as a starting point. It has the advantage of being a rather complete flagellate and of possessing, amongst others, an undulating membrane like that of the trypanosome. Messrs. Laveran and Mesnil[2] have studied the morphology of this organism very closely, and we have no change to make in their very accurate description.

It is a pyriform organism, of which the thicker extremity is directed forwards, and gives insertion to three or four flagella and also to an undulating membrane which extends in a spiral round the body to the posterior and generally thread-like extremity. Now, Laveran and Mesnil have shown that the free thick edge of the membrane was formed by a true flagellum which actually sprung, like the others, from the anterior extremity, but then curved backwards towards the posterior extremity of the body, where it ends in a free portion which one may consider a posterior flagellum. If now one observes the internal organs, one perceives the existence of a sort of hyaline rod which extends from one end to the other and constitutes a true inner skeleton.

Towards the anterior extremity one sees the mouth opening into a long or short pharynx. The rather voluminous nucleus is situated in the same part. Lastly, at the terminal extremity, at the base of the flagella, one sees a mass made up of a certain number of grains of chromatin, the number appearing equal to that of the flagella. This mass is considered the centrosome. There is no evidence of a contractile vesicle in the finely granular protoplasm, but a few alimentary vacuoles and some granules of pigment are seen.

If we now study the genus *Englena*, which has been very precisely compared by Sambon with the trypanosome to indicate analogy in the centrosome and the contractile vesicle, we perceive in the vicinity of the mouth and of the contractile vesicle the existence of a very small mass of chromatin substance from which starts a flagellum becoming immediately free. This is the centrosome; here the two extremities have nearly the same shape; it is nevertheless certain that the extremity of the *Englena* possessing the mouth and the centrosome is identical with the anterior extremity of the *Trichomonas*.

If we next take the genus *Herpetomonas*, so well described by Léger,[3] we find ourselves in the presence of a flagellate already much modified by parasitism, and which resembles the trypanosome so closely that some authors have mistaken one for the other. It is really a fusiform organism having a large nucleus in the middle and a free flagellum at one extremity. But this time, even with the aid of a high magnifying power, one does not see the least trace of an undulating membrane. The mouth, no longer useful to this creature living in the midst of alimentary and directly assimi-



A, *Trichomonas*; *B*, *Englena*; *C*, *Herpetomonas*; *D*, *Trypanosoma*.

a, anterior flagella; *b*, mouth; *c*, centrosome; *i*, inner skeleton; *n*, nucleus; *o*, undulating membrane; *p*, posterior flagellum: *v*, contractile vesicle.

lable substances, has disappeared. Which, then, is the anterior extremity? One sees that the flagellum has its origin in the more rounded extremity and is inserted into a small mass of chromatin which is evidently the centrosome, and which is itself, as in the *Englena*, in close contact with a large contractile vacuole. This extremity is indubitably identical with the anterior extremity of the *Englena* and the *Trichomonas*.

If now we come back to the trypanosome, we shall see that it is easy to show which extremity ought to be considered the anterior. Indeed, even in the opinions of Laveran and Mesnil (*Ibid.*), an undulating membrane is nothing more than a flagellum linked with the body for a certain part of its length; besides, it presents the same relations with the centrosome as an ordinary flagellum.

Now the centrosome, from which the undulating membrane of the trypanosome originates, occupies the more rounded extremity, and is, as in the Englena and the Herpetomonas, in contact with a large contractile vacuole. Compared with other types, then, it is obvious that it is this extremity which ought to be considered the anterior. The trypanosome can be compared in a way with a herpetomonas, of which the anterior flagellum would have been curved back on itself and bound to the body as an undulating membrane; doubtless thus better adapted to locomotion in the capillaries. But its real origin is indicated by the position of the

[2] A. Laveran et F. Mesnil, "Sur la morphologie et la systématique des Flagellés à membrane ondulante (genres Trypanosoma Gruby et Trichomonas Donné)." *Comptes Rendus Acad. des Sciences*, cxxxiii., p. 131, 15 Juillet, 1901.

[3] L. Léger, "Sur la structure et le mode de multiplication des Flagellés du genre Herpetomonas." Kent, *Comptes Rendus Acad. des Sciences*, April 7, 1902.

centrosome. As flagella are always inserted on the anterior extremity of the body, the centrosome will help in the discovery of this extremity.

If we now consider the mode of locomotion of flagellates, we know that the flagellum is placed in front during motion, and that it drags the body towards it, this being the opposite of the position of the tail of the spermatozoid, which pushes the body forwards. As to the undulating membrane, it has a double *rôle*. In more differentiated creatures, and in those possessing a mouth, it serves to drag to the latter the food particles which it meets on the way during the rotatory movement of the body as it moves forwards. But it would also seem that it can serve *in motion* to permit the parasite to move backwards, thanks, doubtless, to the movements of the free end of the flagellum. As a result, the trichomonas which possesses both flagella and an undulating membrane, can move equally *backwards* and *forwards*, whilst the Englena and the Herpetomonas can move *forwards* only, and the trypanosome *only backwards*. It must not, then, be said that the flagellum is placed anteriorly in the trypanosome simply because it lies in the direction of motion. As a matter of fact, it is situated posteriorly, and, if it is in the direction of motion, it is just because the trypanosome moves backwards. Nobody has ever thought of making the head of the crab the posterior extremity of the animal under the pretext that the direction of progression negatives the usual idea of its structure. The laws of morphology must be applied to all living creatures; one must not reason in one way for a trypanosome, and in another for a cephalapod.

It may also be as well to add that, if the trypanosome generally moves in the direction of the flagellum, it may also, though much more rarely, move in the opposite direction. It is at least an additional argument in favour of the opinion held by Dr. Sambon and myself.

TROPICAL HYGIENE,

By W. J. Simpson, M.D., F.R.C.P.

Lecture V. *continued.*

(*Continued from p.* 387.)

Collection, Removal and Disposal of Waste Matters.

Disposal of Sewage.—The sewage, once it has reached the outfall, has still to be disposed of, and the method depends on the situation and circumstances of the town. If near the sea the crude sewage may be discharged into it, or if at the mouth of a tidal river and no towns intervening, the quickest mode is to discharge the sewage into the river. This can be done without nuisance if the river is large, for the dilution to which the sewage is subjected, together with the action of dissolved oxygen in the water, fish and bacteria, will purify the sewage to a certain extent. If the town is not so situated, then this ready method of disposal is not available and the sewage has to be purified before it is permitted to flow into a river or stream. The methods employed for this purpose have been (1) precipitation, (2) land irrigation, and (3) filtration.

The precipitation processes consist in the addition of some chemical or chemicals to the sewage by which the suspended material in the sewage is deposited in tanks into which the sewage is conducted, the supernatant fluid flowing from the tanks to be discharged into a stream or to be conveyed to land where it undergoes a further process of purification. The deposit, called sludge, which is left in the tanks, may be dug out and disposed of by being used as a fertiliser for the land, or by putting into barges and carried out to sea into which it is thrown, or it may be pumped up into presses on the premises of the sewage works and subjected to very high pressure, which converts the semi-liquid sludge into dry cakes, which are then sold for manurial purposes, or it may be burnt in destructors and converted into clinkers, which are then used for road-making and other purposes.

A large number of chemicals have been used to cause precipitation; the majority of them contain lime. Many of these combinations or processes are now obsolete, and the only ones of value are lime, alumina and iron, and the best of these is iron. Alumina is chiefly valuable for removing the colour from the effluent. At the most these chemicals only clarify the sewage. There is no process of precipitation that will do more than separate the suspended matter from the liquid matter, hence in every precipitation process the effluent is foul and contains dissolved sewage. The precipitation process is not adapted to hot climates, as the nuisance attending the exposure of so much sewage is likely to be intolerable. Owing to the effluent being foul it is unfit to be discharged into a stream and ought always to be submitted to further treatment. This further treatment is the application of the effluent to land, which is effected either by broad irrigation, as in the case of sewage farms, or by downward intermittent filtration.

Broad irrigation means the distribution of sewage over a large surface of ordinary agricultural land, having in view a maximum amount of growth of vegetation (consistently with due purification) for the amount of sewage supplied.

Filtration means the concentration of sewage at short intervals on an area of specially chosen porous ground as small as will absorb and cleanse it; not excluding vegetation, but making the produce of secondary importance. The intermittency of application is a *sine qua non* even in suitably constituted soils wherever complete success is aimed at.

With broad irrigation one acre of land is required for every 100 persons. With intermittent downward filtration one acre is required for 1,000 persons. In sewage farms the land is laid out in broad sloping ridges down which the sewage is led into furrows which separate the ridges. The distance between the ridges may be 20 to 30 feet. It is thus brought in contact with the crops on the land. The main points to be avoided are flooding and endeavouring to put too much sewage on a given area of land. The land requires to be under-drained in order that there shall be sufficient aeration, but care requires to be taken that it is not too much under-drained, which is likely to cause hardening and cracking of the ground so that the sewage passes direct through the cracks to the underground drains without purification.

In intermittent downward filtration the land may be laid out in level beds or in narrow furrows and ridges, the sewage being let into the furrows and the ridges cultivated. The sewage passes through the soil, and in its progress is more or less purified and escapes by means of underground drains.

Both by broad irrigation and by intermittent downward filtration the sewage loses its organic matter partly by mechanical filtration and partly by oxidation. This oxidation was at one time believed to be solely due to the action of oxygen derived from the air in the interstices of the soil. It is now known that oxygen is necessary, but the chief transformation is carried on by micro-organisms in the soil, which live in the superficial layers. These microbes attack the nitrogenous and carbonaceous matter in the sewage, converting it into compounds such as carbonic acid and water, while the nitrogen is converted into nitrates and nitrites.

It is the discovery of the *rôle* which these micro-organisms play in the purification of sewage on land that has led to a remarkable revolution in the proposed treatment of sewage. Experiment has proved that bacteria can be used not only to break up the organic impurities in sewage, but also to dissolve and to place in solution all the solid matter of sewage. This is a most remarkable advance. The process is known as the septic tank system. The plant consists of an underground tank and a series of filters filled with furnace clinkers or coke breeze. The grit and sand in the sewage is allowed to deposit in a small chamber before the sewage flows into the tank. The pipe that conveys the sewage into the tank dips below the water in the tank, and the pipe which takes the sewage from the tank on to the filters is also below the surface. By this arrangement the sewage is disturbed as little as possible; a scum collects on the surface, and the whole of the sewage is subjected to the action of the anaërobic microbes in the sewage. These break up the solid matters, rendering them soluble, with the result that no sludge forms in the tank.

This discovery of the action of the anaërobic microbes gives a reason for the fact that in the iron tanks that are used as cesspits in Georgetown, as previously mentioned, hardly any solid was found and a thick scum was always found floating on the surface of the liquid when the tanks were emptied. The sewage thus altered then passes on to the filter beds and is subjected to the action of the aërobic microbes in the filters. The effluent when tested shows purification to the extent of about 80 per cent.

So much for waste products and their disposal. Other factors of health are the condition of the soil and the construction of dwelling houses.

The condition of the soil depends much on its character and the amount of natural drainage which exists. A damp soil is always favourable to malaria. When the sub-soil water is high, so as to waterlog the soil, the drainage is always inefficient, and there will be plenty of means by which mosquitoes breed. The same with reference to the turning up of the soil so that pools and puddles are formed. It is necessary under these circumstances to provide proper drainage of the land.

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THE

Journal of Tropical Medicine

January 1, 1904.

ANNOUNCEMENT.

JOURNAL OF TROPICAL MEDICINE.

Prize Essays on Subjects connected with Tropical Diseases.

A Prize of the Value of £10, entitled the "Sivewright Prize,"

Presented by the Hon. Sir James Sivewright, K.C.M.G., LL.D., for the best article on

The Treatment of Dysentery.

The length of the article not to exceed 5,000 words.

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by July 1st, 1904. The papers sent in become the property of the Journal, and may be published as the Editors decide. The papers may be written in English, French, German, Italian, or Spanish.

THE YEAR 1904.

To-day we publish the first number of the Seventh Volume of the Journal of Tropical Medicine. That the Journal fulfils the purposes for which it was intended, in some degree at any rate, is evident, although we are well aware of shortcomings. The chief difficulty is limitation of space, which even the conversion of the Journal from a monthly to a fortnightly issue, in January, 1901, has not served to overcome. The remedy would appear to be a weekly issue, and serious considerations in that direction have been entertained. We have the satisfaction of knowing that, owing to our readers being so scattered over the world, the Journal is perhaps more widely distributed than any other publication, medical or lay; and our correspondence is dated from verily "the uttermost parts of the earth."

We commence the year 1904 with better prospects than at any time since the Journal was first issued in 1898; and we thank our contributors for many valuable articles in which several subjects new to science have been brought to the knowledge of the medical profession.

VISITORS FROM THE "INSTITUT DE MÉDICINE COLONIALE" OF PARIS, TO THE LONDON SCHOOL OF TROPICAL MEDICINE.

On December 28th Professor Blanchard, Professor Wurtz, and twelve of the medical men studying at the Institut de Médicine Coloniale, in Paris, visited the London School of Tropical Medicine. Dr. G. C. Low, the Superintendent of the School, gave a demonstration in the newly appointed laboratories, of objects of interest in tropical medicine, during the forenoon. Luncheon was served in the School, and after luncheon a photograph of all those present was taken as a souvenir of the interesting occasion. During the afternoon Sir Patrick Manson gave a clinical demonstration of cases in the wards of the Seamen's Hospital, Albert Docks.

On Tuesday, December 29th, Professors Blanchard and Wurtz, and Doctors José d'Aguiar, Louis Canon, José Y. Cardenas, Coope, Léon Dyé, Mille, Monnier, Raymond Penel, Arsenio Poupin, R. Tissier, Thiroux, and Zemboulis, were entertained at dinner at the Trocadero Restaurant, by several members of the staff of the London School. Sir Patrick Manson occupied the Chair. The toasts of H.M. the King and of President Loubet were cordially received. The Chairman welcomed the visitors as *confrères* and co-workers in the field of tropical medicine, and congratulated Professor Blanchard and Professor Wurtz upon the institution of a School of Tropical Medicine in Paris. He was aware they had difficulties to contend with in Paris, similar in many respects to those encountered by the School of Tropical Medicine in London, but with the enthusiasm, energy and vitality so characteristic of the French nation, he felt confident these difficulties would soon be overcome. Sir Patrick was confident that in France a strong man with an influence in the State would come forward and help the School, as Mr. Chamberlain had done in this country, with the greatest possible good to humanity. We have to thank France for laying the true foundation of modern tropical medicine, for, from the discovery of the malaria parasite by Laveran most of our advances in this direction are dated. Professor Blanchard, in reply, thanked the staff of the School of Tropical Medicine for the cordial reception that had been accorded to his colleagues and himself during their visit to London. British medicine was adorned with many illustrious names in the department of tropical medicine, but by none so efficiently as by their distinguished chairman. Dr. Louis Sambon proposed the toast of the visitors. Professor Wurtz, in his reply, stated that they had seen much to interest them since they came to London, and they would carry away with them a very agreeable remembrance of the friends they had made here, and of the hospitality which had been extended to them.

The arrangements for the entertainment of the visitors from Paris were admirably arranged and carried out by Mr. P. Michelli, Secretary to the Seamen's Hospital Society, to whom the teachers in the London School of Tropical Medicine are deeply indebted.

SIR P. MANSON ON THE LONDON SCHOOL OF TROPICAL MEDICINE.

Sir Patrick Manson, M.D., F.R.S., gave an address on December 7th at the London School of Tropical Medicine, Seamen's Hospital, Royal Albert Dock, E., on what the school has done, is doing, and hopes to do. The occasion was the departure of Sir Francis Lovell, the Dean, for the East, on behalf of the school. The hospital and school were open for inspection, and a numerous company of ladies and gentlemen interested in the institutions attended. Admiral Sir R. More-Molyneux presided, and among those present were Sir W. S. Church, M.D. (President of the Royal College of Physicians), Sir Francis Lovell, Inspector-General E. Mahon, C.B., Mr. H. S. Wellcome and Mrs. Wellcome, Sir Frederick Young, Dr. and Mrs. Guthrie Rankin, Mr. L. Vernon Cargill, F.R.C.S., Professor and Mrs. Simpson, Dr. and Mrs. Bashford, Dr. and Mrs. Buzzard, Mr. C. T. Orford, Mr. Herbert Read (of the Colonial Office), Mr. and Mrs. Cantlie, Mr. George Lidgett, Dr. Landwith (of Cairo), Captain Hodgkinson, R.N., and Mr. P. Michelli.

Sir P. Manson, who was received with cheers, said: It is unnecessary for me to give any detailed account of the foundation of this school and of the reasons which led up to it. These those of you who care to look into the matter will find fully set forth in the preamble to

the syllabus of the course of study. My object, or rather the task that has been set me for this afternoon, is to put forward the claims of the school for public support in such a fashion that Sir Francis Lovell may make use of what I say in his forthcoming attempt (the second which he has made) to gather funds to carry on what we cannot but consider an important and national enterprise. I am told that I am to speak of what the school has done, of what it is doing, and of what it hopes to do. But before proceeding to this I should like to take advantage of the opportunity to make public acknowledgment of two obligations that we who are interested in the study and practice of tropical medicine labour under.

Mr. Chamberlain and Tropical Medicine.

The first of these is to the late Colonial Secretary, Mr. Chamberlain, of whom we can truly say that he has been the mainspring in this movement for education in tropical medicine, and that without him the world would certainly have been poorer to-day in respect of many important facts that the different schools of tropical medicine which he has called into existence have added, either directly or indirectly, to the common stock of medical knowledge. I dare say some of my audience think that fiscal policy, free trade and fair trade, protection and retaliation are very important things. That they are important I admit; but, after all, they are ephemeral questions, insignificant if we think of it in comparison with the solid and enduring contributions to knowledge which this school as well as other tropical schools have within the last few years been privileged to make. These contributions to human knowledge are indirectly owing to Mr. Chamberlain. I make bold to say that, in this respect, the educational policy which the late Colonial Secretary devised and fostered will have a more permanent and much further reaching influence than anything he has said or done in connection with the fiscal and Imperial questions with which his name is associated, and which are at present agitating the country. In this matter of tropical medicine Mr. Chamberlain deserves a title far more honourable than that of Imperialist—he is a humanitarian.

The Seamen's Hospital Society.

The other acknowledgment which I should like to make on behalf of the votaries of tropical medicine, and of those who have benefited, and in the future shall benefit, by the movement in education in tropical medicine, is to the Seamen's Hospital Society and their governing body. Without them, so far at least as London is concerned, tropical medicine would have had no suitable habitation. Their intelligent appreciation of their responsibilities as administrators of a great public trust, their catholic interpretation of their duties could not have been better evidenced than by the support they have given to Mr. Chamberlain in his desire to foster tropical medicine. They perceived in the scheme a wider opportunity for discharging their trust than was afforded by the medical treatment of some few sailors in the Port of London. They have systematically taken a keen and active interest in the building of the school, in the extension of the hospital, and they have advanced money when temporary accommodation of this description was required. In a hundred other ways they have been helping forward the good work. They have now the satisfaction of knowing that their view of their duty was a right one, and that the Seamen's Hospital Society has already benefited, directly or indirectly, by their enterprise, their intelligence, and their foresight.

Education and Research.

I now pass to the more immediate subject on which I am called upon to address you. It naturally falls under two headings—Education and Research. As regards the former, I would state that since the school opened on October 3, 1899, no fewer than 354 students have passed through its portals. Our first session we had 27 students; our first two years—that is to say, during six sessions—we had an aggregate of 149 students; our last two years, also during six sessions, we had 178 students. These figures show a steady increase in the numbers attending the school, but this increase in number does not quite express or adequately represent the increasing popularity and usefulness of the institutions, for whereas in the earlier days of the school's existence many of the students came for one or two months only, in these later times a large proportion of the students remain with us during the full course of three months. So far as figures go, this is a most satisfactory state of affairs. It is hardly for me to say what the value of the teaching may be, but this I feel justified in saying, that every student who has entered the school has had an opportunity of acquainting himself with the more important facts of tropical pathology, with the practical methods of diagnosing tropical disease, and with the practical methods of treating tropical disease. When they leave us, a large proportion of the students, if not all of them, have a genuine practical grasp of their subject. They have been in actual touch with the raw material, so to speak, the germ causes of disease, and the pathological effects of the operation of these germs on the human body. They have seen, and most of them have applied for themselves, the most recent methods of diagnosis. They have seen in operation the methods of treatment of best repute. So far as teaching and opportunity can ensure, they have left us qualified for actual practice in the Tropics. This essentially practical education cannot fail to be of vast service to our students in their future work, to increase their usefulness as practitioners, and to increase their value to their employers. It is impossible to gainsay the value of such training. But, over and above this, our students in most instances have been sent out with a knowledge of the theory of the subject, thoroughly abreast of the times, knowing what has already been done, and thoroughly apprehending what still requires to be done; in other words, they have gone forth qualified not only to practise the art, but also to advance the science of tropical medicine. So it has come about that at the present day, instead of the two or three men who took a more or less languid interest in tropical disease some five or six years ago, a whole army of eager investigators has arisen, mainly composed of men educated or inspired by the Liverpool and London schools.

Achievements of the London School.

This multiplication of investigators, and therefore of chances of discovery, has already borne remarkable fruit. Without alluding to what our friendly rivals in Liverpool have done, I could point to not a few notable triumphs by men from our London school. Let me enumerate some of these, and as I do so, please bear in mind that we have been in existence for only a few months over four years. (1) Let me point to an observation by our present superintendent, Dr. Low, an observation made in our laboratory. For the first time he showed in what manner the blood-worm, responsible for an important group of tropical diseases, represented by the hideous and disabling disease known as elephantiasis, gains access to the human body. He showed that this worm at an early stage of its existence, like the germ of malaria, is introduced into the human tissues by the proboscis of the mosquito. This important discovery has a very practical bearing, for it indicates with precision the way by which elephantiasis and its congeners may be avoided. (2) Dr. Sambon and Dr. Low, sent by the School with the aid of funds partly supplied by the Colonial Office, clearly demonstrated by an experiment, which might very well have proved to the experimenters a serious matter, that man can live in the midst of malaria if he only employs simple and practical measures against mosquito bite. These gentlemen, Signor Terzi, and their servants, lived for three or four months during the most unhealthy season of the year, in the most unhealthy place in Europe, and, thanks to the measures I have mentioned, not with injury, but with positive benefit to their health. (3) The school, by importing infected mosquitoes from Italy and then setting them to bite healthy individuals in this laboratory, and thereby promptly conferring malarial disease to those so bitten, gave the final and most telling proof hitherto obtained that malaria is conveyed by the mosquito. (4) A pupil of the school, Dr. Forde, who had learned here the value of the microscope in the diagnosis of tropical disease, discovered in the Gambia Colony the presence in the blood of a man of a new parasite, a parasite which was subsequently recognised by Dr. Dutton, of the Liverpool School of Tropical Medicine, as belonging to a group of germs responsible for many and grave diseases among the lower animals. This discovery is already bearing remarkable fruit. (5) Only last year Dr. Castellani, another pupil of the school, demonstrated the association of the same parasite, called a trypanosoma, with one of the most terrible diseases to which tropical humanity is liable, viz., sleeping sickness. Subsequent investigation by Colonel Bruce and others has wholly endorsed the truth and importance of Dr. Castellani's discovery. (6) Until a fortnight ago it could not be affirmed with certainty that this parasite—this trypanosoma—was really the cause of sleeping sickness. The presumption that it was so was strong, but there remained the possibility that its presence in cases of sleeping sickness might be merely a matter of more or less accidental concurrence. In consequence of the opportunities for study that our school and hospital provide, this possibility has now been finally disposed of. Last year a patient, in whose blood it was conjectured that this new parasite—this trypanosoma—was present, was admitted to our wards for treatment and observation. Our late Superintendent, Dr. Daniels, after a lengthened search, confirmed the conjecture by finding the parasite in the patient's blood. Unfortunately, though we gained much in knowledge by our observation of this case, our efforts at treatment proved futile. The patient left the hospital in March last, but we kept in touch with her, examining the specimens of her blood, which were sent to the laboratory from time to time, and watching the progress of the symptoms. Some two months ago the patient began to show symptoms of sleeping sickness, and died of that disease on the 26th of last month, two years and three months after receiving the deadly infection through the bite of an insect, a species of tsetse-fly, common in the place where she had resided on the Upper Congo. Until we have absolute assurance as to the validity of a discovery responsible action is half-hearted, or is delayed, and very properly so, as not a few fiascos, bred of pseudo-discoveries, have shown in recent years. Assurance gives confidence. Knowing that the trypanosoma causes sleeping sickness, we know how to proceed, if not in curing, at any rate in preventing, this terrible disease—a disease which, I am sorry to say, is rapidly spreading, not only in the Congo Free State, but in Uganda and elsewhere in Africa. For this knowledge the world is mainly indebted to the London School of Tropical Medicine. This knowledge will in the end result, if not in our being able to cure, at least in our being able to prevent, sleeping sickness. There are other discoveries which might be accredited to the school, but those I mention suffice to show that our existence has not been unproductive in this line, nor altogether in vain. That the few thousand pounds the establishment has cost the country has been more than well invested, who can gainsay? These permanent additions to human knowledge, which, as the years roll on, are bound to accumulate around them additional knowledge—indeed, they are already doing so—will yield a huge compound interest, and do more than justify our existence.

Acknowledgments to Sir John Craggs.

I have already acknowledged our indebtedness to Mr. Chamberlain and to the Seamen's Hospital Society, but in connection with the subject I have just alluded to I should like to mention another name, that of one whose liberality has been instrumental in no small degree in furthering these discoveries, I mean Sir John Craggs. Recognising from the outset the importance of the movement in tropical medicine, he generously provided a scholarship of £300 a year, tenable for three years, for purposes of research. Much of the advance in tropical medicine which I have alluded to is owing to this act of generosity on the part of Sir John Craggs. I understand that he is a wealthy man, one, doubtless, who has made many profitable investments; but I venture to say that none of his investments approach in yield the permanent value of the £900 which he gave to the London School of Tropical Medicine. You will be glad to hear that Sir John Craggs retains his interest in our work; he has again made us the recipients of a very handsome annual

Visit of the "Institut de Médecine Coloniale" of Paris to the London School of Tropical Medicine, on Monday, December 28th, 1903.

Dr. Raymond Penel, Dr. R. Tissier, Dr. G. A. Park Ross, Dr. H. W. Brown, Dr. François Cape.
Dr. Thiroux, Dr. José Y. Cardenas, Dr. Jose d'Aguiar, Dr. Leon Dyé, Dr. L. Monnier, Dr. Mille, Dr. Arsenio Poupin, Dr. W. Grahame Ross.
Dr. E. Zemboulis, Dr. L. Tanon, Mr. P. Michelli (Sec.), Dr. Low (Medical Tutor), Prof. Hewlett, Prof. Blanchard, Sir P. Manson, Prof. Wurtz, Dr. Sambon, Mr. J. Cantlie, Dr. Dundas Grant.

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donation, to be awarded to any actual or past student of the school, who, during any current year, shall make an important contribution to tropical medicine. My message to those who hear this is, "Go thou, and, according to thine ability, do likewise."

The Investigation of Beri-beri.

The discoveries I have mentioned are accomplished facts, very important facts, but they are not enough; they only serve to stimulate us to attempt more. Consequently, we have other schemes on foot, some of them in active operation, others only in contemplation. For example, two years ago we sent Dr. Durham to study that most important and mysterious disease beri-beri. Although so far the results have been principally of a negative character, they are none the less valuable, for negative results have often a positive value, inasmuch as they exclude many wrong hypotheses which must be disposed of, and they narrow down the field in which future investigators need work. We do not despair of getting light on this disease. I may mention that, by arrangement with the Government of the Federated Malay States (where beri-beri is rampant), our late Superintendent, Dr. Daniels, has been placed in charge of the very complete Research Laboratory at Kuala Lumpur. Here, with abundant material at his disposal, with a certain amount of leisure, so necessary for scientific investigation, this highly accomplished and experienced pathologist will undoubtedly, even if he does not unveil the mystery of beri-beri, add to the lustre of our school. I might say a word about the very satisfactory arrangement that has been concluded in reference to this appointment, an arrangement which Sir Francis Lovell did much to bring about. In future the school will have two superintendents, each of whom, during alternate periods of about three years, will have charge first of the London school and then of the Kuala Lumpur Laboratory. The advantage of such an arrangement is obvious, for the superintendent of the school in his three years' tenure of office here will not have time to become stale, and relapse into a mere demonstrator; and the superintendent of the Kuala Lumpur Laboratory, after having had practical experience of tropical conditions and medical needs, when taking his spell of work at the school will be brought into contact with new minds and with current European thought and discovery. For this arrangement, so advantageous to both parties, we are principally indebted to Sir Frank Swettenham, a gentleman whose deeds, to my mind, are wiser than his words. I say so, because only lately, in discussing a lecture by Major Ross on malaria, at the Colonial Institute, Sir Frank made somewhat light, as I thought, of recent medical discovery. I fear some of his audience on that occasion may have gone away with the impression that this able administrator, who had so large a personal experience of tropical matters, including tropical disease, had but a very poor opinion of what we are doing and of what we have done. I suspect, however, that there is a good deal of the humorous about Sir Frank Swettenham, and that he did not altogether mean what he said; else how reconcile his utterances on the occasion I allude to with his wise and weighty public measures at Kuala Lumpur? He must be one of those amiable cynics who, whilst they snarl at the beggar, give him a hot supper and a shilling to get a bed.

What the School Requires.

At the present time we have two schemes of investigation in contemplation. For one of these we have a certain amount of money in hand, and shall presently proceed with it. For the other we must wait for money, and for what is even more difficult to get—suitable men. I think I have said sufficient to prove that the London School of Tropical Medicine has done good work, is doing good work, and hopes to do more good work—that is to say, we are fulfilling our function, and to this extent we are a prosperous institution having a distinct claim on the public. I am told by those who know, that no public institution in Great Britain is entitled to be called prosperous until it is over head and ears in debt. Now we, too, have taken care to establish that claim to be considered prosperous. We are not over head and ears perhaps, but still, we are in debt, and feel acutely what Bon Gaultier describes as "that eternal lack of pence that vexes public men." The bill for these buildings has not been quite discharged. Our teachers are strictly honorary—their pay is so small that the laboratory microscopes are sometimes required to see it. Our ambition to gather fresh laurels in the field of investigation is cramped. We wish to furnish our museum and our library on a scale adequate to the needs of the school. These, and many other requirements, demand money. In short, we want £100,000, or as much of that sum as we can get. We have given full value for that money. Apart from the education we have supplied to our 354 students, anyone of the discoveries I have mentioned is worth the sum I name ten times over. We have given the public a great deal more than we have received, or are ever likely to receive. I have, therefore, no hesitation in asking for something more on account.

Sir F. Lovell's Work.

Sir Francis Lovell, an old *employé* of the Colonial Service, full of years as of honours, who might very well with comfort to himself, and without incurring the reproach of idleness, have spent his well-earned leisure by his fireside, or in reading this newspaper in the easiest chair in the warmest corner of his club, was so struck with the value of this institution, the work it was doing, and the importance of the work it proposed to do, that when he retired some years ago from the Colonial Service, instead of consulting his own comfort, he threw himself heartily into our work, became the Dean of our school, and has gone about the world trying to put us on a sound financial basis. Two years ago, when we were in straits for funds, Sir Francis paid a visit to the East, and succeeded in collecting for us a very substantial and a very welcome sum. He is again about to leave on the same errand, and we are here to-day to wish him God-speed in his self-imposed, somewhat arduous, and not very pleasant task. We trust his success will be as great as on the previous occasion, and we hope that he will convey personally the thanks of the school to the many donors to our

funds whom he succeeded in interesting in this cause. More especially do we desire him to express our gratitude to the Hon. Bomanji Dinshaw Petit, who, with the generosity so characteristic of his race, gave the school no less a sum than 100,000 rupees. It would be well for the world if there were more Parsees, especially of Mr. Petit's stamp. We hardly expect that Sir Francis Lovell will meet with such another, but we are not without hope. When I think of my former experience of the Chinese, of their great interest in public charities, and their generosity in supporting these charities, when I think of the wealth that so many of them have accumulated, under the *ægis* of the British flag, in the Straits of Malacca and elsewhere, I do not despair of finding a Chinese rival to Mr. Bomanji Petit. Perhaps no country in the world is so likely to benefit by the advances in tropical medicine which have been made in recent years as the British Colonies and Protectorates in the Malay Peninsula. One of the diseases I have alluded to—beri-beri—is not only a deadly disease, but it is a terrible drag on the mining and agricultural industries there. Now beri-beri is a subject to which the school has given much attention. It is a disease that we hope some day to find out the cause of, and perhaps thereby be able to see our way to an effective treatment, and also to appropriate means of prevention, and I think we do not appeal in vain to our Chinese fellow-subjects there when we ask them to contribute something out of their wealth to enable us not only to relieve (as regards this disease) men of their own race, but to enable them indirectly to add to their health and wealth and general prosperity. Could we but remove beri-beri from the Malay Peninsula, we would add enormously to the prosperity of that country. The Chinese, who are those most interested in the matter, should take a special interest in fostering our efforts to unravel the mystery of this disease, and I hope I do not appeal to them in vain for funds for this and similar objects. We have received liberal support from many business houses and corporations trading with the East. It is unnecessary to point out to them the importance of our work, and we feel sure that they too will come forward in the future as they have in the past, each according to his means. I began this address by making two acknowledgments. I will conclude it by making two more acknowledgments—one to the Press, both of this country and of the East. Sir Francis Lovell tells me wherever he went he received most cordial and most welcome assistance from the Press, and I trust this hospitality will be extended to him again during his approaching and second visit to the East. The other acknowledgment I desire on behalf of the school to make is to my medical brethren in India, the Straits, Hong Kong, and elsewhere. Without their co-operation Sir Francis Lovell would have accomplished little or nothing. This hearty practical sympathy from the members of my profession is peculiarly gratifying to us, for it shows us we have the approval of those who are best qualified to judge of the work the school has undertaken and of the way it has set about doing it. No one understands what a doctor requires so well as another doctor. It has been said, "He who gives to the poor lends to the Lord." I will parody this and say, "He who gives to the London School of Tropical Medicine lends to humanity."

A vote of thanks was cordially passed to Sir P. Manson, on the motion of Sir W. Church, seconded by Sir F. Young.

British Medical Association.

FIVE CASES OF ABSCESS OF THE LIVER.

THREE OPERATED ON BY AND UNDER THE CARE OF FLEET SURGEON G. KIRKER, R.N.

By Fleet Surgeon P. W. BASSETT-SMITH, R.N.
Lecturer on Tropical Diseases, Haslar.

THE following five cases of "abscess of the liver" lately under treatment in the Royal Naval Hospital, Haslar, are, I believe, of sufficient interest to be recorded as examples of the different forms that may be met with in England in men who have returned from the Tropics. A study of them also shows emphatically the value of systematic examinations of the blood for the presence of leucocytosis, which is a constant and most important diagnostic sign in the detection of these deep-seated abscesses; they also point to the great value of a free examination of the part by a well-devised open operation; for, though a cure may take place by natural means—that is, by spontaneous rupture and evacuation through the lung, as in Case 4—yet such an eventuality is most frequently the commencement of a prolonged course of a hectic fever, and often death from intercurrent pulmonary complications. In all five cases there was found a history of dysentery, but in none had it been of a severe character.

The surgical treatment of abscess of the liver is still one over which there is much difference of opinion, but the value of the free incision is steadily gaining ground, when instead of stabbing the organ in the dark, as is so frequently done, it is attacked either through the chest walls and pleura, or directly from the abdomen, with greater chances of rapid and successful results. In Cases 4 and 5 we see how exploratory punctures failed entirely to find the abscesses, which fortunately then burst upwards into the right lung, and in one apparently ended most satisfactorily, for the patient, though he felt quite well, with the temperature and respiration normal, yet there remained at the right base a patch of consolidated lung, ready to give trouble with any extra cold, &c., the other still continues to spit up small quantities of liver pus eight months after the rupture, and is cachetic and unfit for duty.

Mr. R. J. Godlee, in the *British Medical Journal* of May 17, 1902, p. 1210, recommends the lower axilla as the best site for incision. Lieut.-Colonel J. Maitland, in the *British Medical Journal* of February 22, 1902, p. 458, points out that puncture alone is attended with considerable risk, and quotes a death due to this procedure. He states that the best operation is through the pleura, and excises a portion of rib, suturing the pleural surfaces together, then the diaphragm and

peritoneal surfaces, if no adhesions are present, and finally enlarging the liver opening with forceps, before introducing two drainage tubes. If opened through the abdomen the peritoneal surfaces should be stitched together, or the part be well packed before opening the abscess. He condemns *in toto* Manson's operation. Captain Keble, R.A.M.C. (*British Medical Journal*, September 6, 1902, p. 702), recommends the open operation and washes out the cavity. In two of his cases there was no rise in the temperature or other clinical sign of liver abscess. Lieut.-Colonel Hatch, I.M.S. (*British Medical Journal*, December 6, 1902, p. 1768) states, from an enormous experience at Bombay, his belief that puncture of the liver is dangerous, and recommends free incision, preferring to open between the ribs, without resection, and without washing out; neither does he stitch the pleural surfaces. He also states that he has seen no bad results from the escape of the pus into the abdominal cavity. Captain Leonard Rogers, I.M.S. (Journal Tropical Medicine, February 16, 1903), from his experience at Calcutta, only found pyogenic organisms in the pus in eight out of twenty-four cases, but demonstrated amœbæ in the walls of the abscess in sixteen out of seventeen. This comparative sterility of the pus may perhaps explain why secondary peritonitis is so uncommon. In two out of the three unruptured abscesses here recorded I was able to isolate a pure culture of the colon bacillus, and in none found amœbæ. In a case which occurred here (recorded in the *Lancet*, August, 1900), when amœbæ were present in the liver pus, the pus was found to be sterile from other organisms.

Blood Examination.

The line of the leucocyte curve carefully taken in these cases (using a Thoma-Zeiss counter) shows in Case 1 a rising leucocytosis before the operation and rapid and steady fall afterwards, the patient making a perfect recovery. In Cases 2 and 3 there was an immediate fall after the operation, increasing again as the temperature rose, falling slowly as the purulent discharge decreased, with exacerbations from probable fresh collections and septic absorption. In Case 2 after operation there was some basic pneumonia of the right lung, the count reaching 80,000, the highest I have been able to find recorded, except in leucocythæmia. In Case 4 with the fever, there was a very high leucocyte count, which after rupture and evacuation rapidly fell but remained above normal even when the patient was discharged; about the same as that found in the more chronic Case 5.

Case 1.—This man, aged 34, was sent to hospital for (?) typhoid, having been ill on board in Portsmouth for four days with abdominal pains and local tenderness, diarrhœa and fever. On admission there was sharp pain in the abdomen, increased on breathing and coughing, decubitus dorsal, and the legs drawn up, temperature was 103°. The temperature continued high, with large diurnal ranges, pain became localised over the liver, and the blood count gave a high and rising leucocytosis, due to a great increase in the polymorphonuclear cells. The serum, tested on two occasions for typhoid, gave negative results. It was evident that a hepatic abscess was present, and on inquiry an old history of dysentery was made out. Fourteen days after admission he was transferred to the care of Fleet Surgeon Kirker, and the abscess was at once opened and drained. Although the prominence was a little more marked on the left side, the incision was made through the right rectus, when the peritoneal cavity was opened, adhesions were found to exist immediately to the left, the incision was then carried through this region, and when the surface of the liver was reached an exploratory needle was inserted and pus found; the opening into the peritoneal cavity was then plugged with iodoform gauze and the abscess opened; it contained a considerable amount of very thick pus, its cavity was washed out, and a drainage tube inserted. There was a short relapse of fever, the temperature rising to 103°, but this gave way to quinine; the blood count nevertheless steadily fell, and in ten days was normal, which seemed to indicate that the rise was not due to reaccumulation of pus and fresh septic infection; the recovery was rapid, and the patient was discharged cured.

Case 2.—Private marine, aged 23. History of dysentery in 1900, and was invalided for it in 1901. Admitted to Haslar in January, 1902, with pain and tenderness over the liver, the pain was severe and resembled biliary colic. There was slight jaundice. Temperature, 99° F. Course: Temperature was remittent in character, liver dulness increased downwards, the tongue thickly coated, abdomen somewhat tympanitic and tender. On the 17th he was transferred to Dr. Kirker for operation. Under an anæsthetic tenseness and fulness were well marked in the epigastric and right hypochondriac regions, a vertical incision was made close to the right linea semilunaris, at the lower part the omentum presented, and on examination with the finger, adhesions were immediately felt above, at the margin of the liver; the abdominal cavity was closed off with gauze and the abscess opened, pus welled up, thin in character; the cavity was found to be near the surface of the right lobe of the liver, the incision was extended along the margin of the ribs and the abscess cavity cleaned out; a little pus got into the abdominal cavity, and this was washed out with hot saline solution, the lower part of the wound was closed up, a gauze drain inserted, and a large tube in the abscess. There was no peritonitis following the operation, but on the fourth day there was considerable cough, hurried respiration, and expectoration of blood-stained sputum. On the seventh day there was an abundant flow of bile from the abscess cavity and rapid breathing; the pleura was explored with negative results, the pain was severe, and the evening temperature 104° F. For the next week bile still escaped from the wound, and his condition was critical. He then began to improve, but a low form of basic pneumonia was present; ten days after he was allowed out in the open air, and was finally discharged to duty. The chief interesting points in this case were: The history of dysentery two years before, the acute symptoms, but without rigors or sweats, the large size of the abscess, the profuse discharge of bile, the secondary pneumonia, and the high blood count throughout,

one week after the operation reaching 80,000 per cmm.

Case 3.—This patient, aged 25, had lately been invalided from Bombay for remittent fever and had served five months previously in the Persian Gulf. He had passed a little blood and mucus, with some pain over the right side of the belly. The temperature rose, and remained up, and in hospital it was noticed that the hepatic dulness was increased. On the voyage home he improved, and the temperature fell, but there was irregular diarrhœa and hepatic tenderness. On admission to Haslar in the end of December the temperature was normal and he was very anæmic, the liver dulness was greatly increased and the spleen was enlarged; there were no sweats, shivers, ascites, or œdema; he was gaining weight, the tongue was clean, and the appetite was good. The part was examined with the X-rays, and the dull area did not appear to move with respiration. The blood showed no malarial parasites, but a leucocytosis. He continued to improve for a time, gained weight and strength, but the pulse was fast, and the cachexia did not pass off; this, with the persistent presence of a high blood count, made a diagnosis of liver abscess probable; so I made an exploratory puncture into the upper and back part of the liver, drawing off thickish pus. He was at once transferred to Dr. Kirker for operation. An exploring needle was passed between the eighth and ninth ribs in the mid-axillary line; pus at once issued; an incision was made close to it about 1½ in. of ninth rib excised, the incision was carried into the pleural cavity; no lung, but diaphragm presented, some pus escaping round the needle; the pleura was plugged all round with gauze, the liver was adherent to the diaphragm, the opening was enlarged, and a great quantity of pus was discharged; the cavity was then washed out, the diaphragm was secured to the deep margin of the wound all round, and a drainage tube inserted. He did well, and in less than a month was convalescent. The interesting features in this case were the long history of fever following diarrhœa, the subsequent improvement with a normal temperature; in fact, an absence of almost all the signs of liver abscess except hepatic enlargement, cachexia, and a high blood count.

Case 4, aged 27, gave an old history of dysentery. The illness had a sudden onset while in barracks. On admission the tongue was coated, there was hectic fever with sweats, no hepatic tenderness, but this organ was enlarged upwards, the dulness extending to the angle of the scapula; there was cough and mucoid expectoration, and shoulder pains; temperature generally 101° at night; his blood count was high, 29,800 per ccm., mostly an increase of the neutrophiles. Next day he was transferred for operation. The liver was punctured in six places, and no pus was found; four days after there was continuous and fairly profuse expectoration of liver pus. The temperature then fell and he made an uninterrupted recovery, except that the blood count kept rather high, 11,000, and there were signs of some consolidation of the right base. At his own request he was discharged to duty.

Case 5, who was aged 35, while serving in the Persian Gulf, had slight dysentery and was treated in Bombay Hospital for (?) enteric. While convalescing, symptoms of liver abscess came on, and he was explored on two occasions without result; this was followed by pleuritic pain and signs of basic pneumonia, and the rupture of the abscess with profuse expectoration of liver pus. On the passage home he improved and went on leave; he returned to Haslar, and as the abscess was fairly local, the drainage imperfect, and he was generally losing ground with hectic fever and pain, he was transferred for surgical treatment, having now been sick for nine months.

The Journal of Tropical Medicine.

CONTENTS.—JANUARY 15TH, 1904.

Original Communications.

A NEW CULICID GENUS FROM UGANDA.

By FRED. V. THEOBALD, M.A.

Two specimens of a new Culicid have been received from Dr. Aubrey Hodges. It forms a new genus which, judging from the small palpi, should come in the Ædinæ, but as palpi are so very variable in each section of the Culicidæ I refrain from including it in either of the two allied sections, Culicinæ or Ædinæ, until males have been taken.

The genus is named after Dr. Aubrey Hodges, who discovered the species.

Genus *Hodgesia*, Nov. Gen.

Head clothed with small flat scales, rather rounded apically and loosely applied to the surface; palpi very small, apparently one-jointed, covered with scales; antennæ with large globular basal joint, 13-jointed, long bristles at the nodes, short along the internodes; proboscis not quite as long as the whole body; clypeus normal. Thorax with the prothoracic lobes covered with flat scales; mesonotum with large, long, narrow-curved scales; scutellum with small flat scales similar to the head; abdomen with flat scales, arranged ventrally so as to form slightly projecting tufts. Legs long, especially the hind pair; apices of the femora and tibiæ rather dilated; fore femora slightly swollen; ungues equal and simple in the ♀.

Wings with normal Culicine venation, but the third long vein is carried past the marginal cross-vein as a scaled vein; the lateral vein-scales long and nearly overlapping those of contiguous veins, *their apices with marked lateral spines.*

Male unknown.

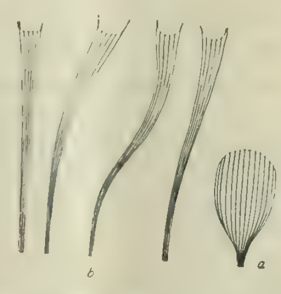
This genus presents superficial resemblances to Stegomyia and others, but can at once be told by the very marked structure of the lateral vein scales.

Judging from the palpi, if their characters are any index at all, this genus should come in the Ædinæ, but, as previously pointed out, I consider they are of no generic or sectional value in the Culicidæ.

Hodgesia sanguinæ, n. sp.

Head black with a median silvery-white area, the scales as mentioned in the generic description; black bristles project over the eyes; antennæ with very large black basal joint; remainder black with slightly paler nodes, verticillate and internode hairs black; clypeus black; proboscis black scaled.

Thorax shiny black; prothoracic lobes with flat silvery-white scales; mesonotum with very long bronzy-black narrow-curved scales; scutellum black with small flat black scales and with black border-bristles; metanotum shiny black; pleuræ black with at least one spot of silvery white scales.



Scales of *Hodgesia sanguinæ*, n. sp. (*a*) Head and scutella scales; (*b*) lateral vein-scales of wings.

Abdomen black scaled with five lateral silvery-white spots, the three apical ones very prominent, the two more basal ones rather indistinct; these spots are more apical than basal and the scales of the apical three apparently stand out from the surface of the body.

Legs black except the bases, which are testaceous, and two silvery spots on the coxæ; apices of femora and tibiæ slightly dilated owing to numerous scales; the fore femora are somewhat dilated.

Wings with brown scales, the median of all the veins broad and spatulate, those of the subcostal, first long

vein and also the second except the lower branch double, the rest single; the lateral vein-scales long and either touching or overlapping, with distinct lateral spines; border-scales clavate; fringe long, scales of three series; first submarginal cell longer and wider than the second posterior cell, its base slightly nearer the base of the wing, its stem rather more than half the length of the cell; stem of the second posterior as long as the cell; the mid cross-vein and the supernumerary not meeting, the former nearer the apex of the wing, at a slightly acute angle to one another; posterior cross-vein nearly twice its own length distant from the mid; the second long vein carried past the marginal cross-vein and scaled past it; a very pronounced pseudo-vein between the fifth and the sixth.

Halteres with the stem testaceous, the knob dark, the stem prominently elbowed at the base.

Length.—2 mm.

Time of Appearance.—June and October.

Habitat.—Entebbe.

Observations.—Described from four females sent by Dr. Aubrey Hodges. They are very distinct and can at once be told by the curious wing-scales. No other species occurs in the genus, so that no comparison is needed. Dr. Hodges writes me that he has not seen it elsewhere than at Entebbe, and that it is extremely difficult to capture undamaged, and that it is a blood-sucker. Dr. Hodges writes that although he had not examined it microscopically, that he suspected it to be either a *Stegomyia* or an *Uranotœnia*, and pointed out that the silvery spots on the under-side (not venter) of the abdominal segments, together with those on the head and thorax, were characteristic of a new species, and such soon proved to be the case.

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WEIL'S DISEASE IN EGYPT.

By F. M. Sandwith, M.D., F.R.C.P.

Consulting Physician to Kasr-el-Ainy Hospital, Cairo.

Synonyms.—Infectious jaundice, febrile jaundice, epidemic jaundice, septic jaundice, bilious typhoid, Griesinger's disease. *French:* Typhus bilieux, ictère infectieux fébrile, fièvre typhoide bilieuse, typhus ictérode. *German:* Biliöse typhoid, icterus typhosus, typhus biliosus nostras.

This disease, like many others little understood, has been called by a variety of names, of which perhaps infectious jaundice is the best. The disease has nothing to do with typhus or typhoid fever, and therefore it is a great pity to continue misleading titles.

Definition.—An acute infectious disease, sometimes becoming epidemic during the summer months, characterised by fever, jaundice, enlarged liver and spleen, nephritis and some nervous symptoms.

History.—Larrey's "yellow fever" in Cairo in 1800 was probably in part this disease. Hirsch records 34 epidemics of jaundice, mostly in Europe, between the years 1745 and 1885. Pruner and Veit (1836) described this disease in Egypt, while Russegger and Hartmann believed it existed as an epidemic in Berber and Dongola. Griesinger, in Cairo in 1851-52, pointed out its peculiar features and differentiated it from bilious remittent and yellow fever, though he believed that it and relapsing fever were both modifications of one morbid process. He treated 132 cases, all Egyptians, at Kasr-el-Ainy Hospital, and, besides making 25 autopsies on these he made 76 other *post mortems* upon cases which had died of this fever. He found so many organs affected that he tried to choose a name, "bilious typhoid," which would be non-committal.

In 1886 Professor Weil, of Heidelberg, published four cases of infectious jaundice under the title of "A Peculiar Form of Acute Infectious Disease Characterised by Jaundice, Swelling of Spleen, and Nephritis." He and other Germans were in doubt whether his cases belonged to a special disease, or to Griesinger's "bilious typhoid," and it was decided to call them "Weil's disease." English and American writers have provisionally adopted this term because it seems preferable to "bilious typhoid," and because every one now agrees that the malady has no sort of connection with relapsing fever. The few people who have had the advantage of seeing Weil's disease in Europe and Griesinger's disease in Alexandria agree in their identity.

Distribution. — Griesinger recorded cases of this disease from Damietta and the Upper Nile. Legrand has reported two fatal cases from Suez; and I saw in October, 1886, an English maid who died of the disease in Cairo, having apparently contracted it in Alexandria. The autopsy was similar to those which I had seen during an epidemic in Alexandria. Again, in January, 1899, three cases of dying men were admitted at Kasr-el-Ainy, and eight others found dead in the street were transferred by the police to Dr. Nolan for a medico-legal report. The diagnosis wavered for a time between hæmorrhagic septicæmia of unknown cause and doubtful relapsing fever, though no spirilla could be found in the blood, until I was able to show, by reference to Griesinger's writings, that the localised epidemic belonged to Griesinger's disease. Since then Stassinopoulos has stated that he has seen three cases in Cairo between 1895 and 1903, similar to those well known to him in Alexandria; but with the above exceptions, the disease seems to be as unknown in Cairo as it is common in Alexandria, where it has been endemic certainly since 1870, and perhaps even longer.

Doubtful cases have been reported from Tantah and Kafr Zayat, and outside Egypt from Malta, the Ionian Islands, Dalmatia, Athens, Constantinople and Syria. In Smyrna the disease has apparently been endemic since 1837, and 185 cases were reported from Nauplia (Greece) during four months in 1886.

In the summer of 1877, during the Russo-Turkish war, several of us then in the Balkans were puzzled by an infectious fever with jaundice which attacked many English doctors and correspondents. In spite of large spleens the disease was certainly not malarial, and we were obliged to accept the diagnosis of local doctors, who were well acquainted with the malady and called it "Bulgarian fever." I have since concluded that this unknown fever was Weil's disease, for though we were camping near lovely rose-gardens, we were surrounded by the unburied bodies of hundreds of men and animals, and by thousands of wounded Turks in every degree of pyæmia and hospital gangrene.

The situation was not unlike that described by Larrey after the siege of Cairo in 1800, when 260 out of 600 French wounded soldiers died of infectious fever with jaundice.

In England small epidemics have been reported in 1895 and 1901, and a few cases have occurred in the United States, while localised outbreaks have been known in Pekin and Tientsin in 1864-65, and again in 1898-99.

It is quite possible that some of the mysterious fevers masked under the heading of malaria in India and Mauritius have been really the disease in question, which I think merits more attention than it usually receives from English and American authors.

Causes.

Age.—The most common age in all countries seems to be from 20 to 30, but it may claim victims from 15 to 40. It has never been recorded in Egypt under the age of 15 years, though there have been rare cases in Germany and Greece between 8 and 14 years of age.

Sex.—Many observers have never seen a case in a woman, and I have only seen one, but Valassopoulos' statistics give 144 men to 9 women. The only reasons one can suggest for the rarity of this disease among women and children are that they are less explosed to unclean occupations and sewage contamination on a large scale, and also that they run less risk than men of being poisoned by contaminated meat.

Nationality. — Griesinger never saw a European attacked, but besides Fellaheen, he met the disease in six Negroes, two Berberin, an Abyssinian and a Bedawi. In Alexandria the Greeks seem more predisposed to it than other Europeans.

Occupation. — In Cairo I can confirm Griesinger's statement that it is as a rule only the lowest classes who are attacked, but in Alexandria during an epidemic it has been seen among bankers, lawyers, merchants and doctors, as well as among bakers, grocers and butchers. In Germany, 38 out of 53 cases were in working men engaged in insanitary occupations. At Nauplia the winesellers headed the list, and I may mention that alcoholic excess seems to be a predisposing cause. Out of 144 men reported by Valassopoulo there were 18 bakers, 9 grocers, 31 clerks, 17 servants, besides 5 cooks, and only 2 winesellers, and no butchers at all.

Season.—The disease occurs in Alexandria between April and October, but rare sporadic cases may be seen during the winter months. Kartulis believes that there are two periods of maximum intensity, between May and June, and again from mid-September to mid-October.

Contamination by Sewage or Putrid Meat.—There can be no doubt that this is a filth disease. In Alexandria it has become more common since the introduction of a bad system of imperfect drainage: the bulk of the patients came from the lowest parts of the town, where the drainage is worst and where the sewers empty into the sea. Cases have been traced to frequenters of coffee-houses in these quarters, yet the suburbs of the town, which are not drained at all, are apparently unaffected.

The two Suez cases resulted after exposure to an open drain undergoing repair. Again at Smyrna the disease only prevails in the most dependent parts of the town, where the sewers join the sea, and at Nauplia it has disappeared since iron drain pipes have superseded badly-jointed stone conduits. In Germany men have caught it after bathing in a river contaminated by sewage, and after eating tainted meat.

There is as yet no evidence that the disease is insect borne, but it must not be forgotten that it occurs in places and during the months which are specially beloved by many insects.

One attack seems to confer immunity, and all observers agree that the disease is not contagious, and therefore nurses do not contract it.

Varieties.—Besides ordinary cases of the disease, there may be very mild ones, or those which are dangerously severe. In mild cases the symptoms may only be present for one week; there may be even no jaundice, and there is no secondary fever.

The severe type is characterised by uræmia, cardiac paralysis, hyperpyrexia, or hæmorrhages. The question as to whether it is right to group, as I have done, all cases of infectious jaundice with similar clinical symptoms under one heading can only be determined by future bacteriological discovery.

Symptoms and Course.

The *incubation period* is very short, seldom lasting longer than one or two days. The onset is sudden, mostly ushered in with a distinct rigor and temperature between 39° and 40° C., accompanied by pain in the muscles and lumbar region, headache and vomiting. These symptoms continue until the third or fourth day, when jaundice appears with marked enlargement and tenderness of the liver, enlargement of spleen and albuminuria, after which the fever usually subsides. The jaundice with the other symptoms gradually disappear, but in about three-fourths of the cases the fever recurs for some days, and convalencence is in all cases very slow.

The important characteristics of the disease have caused writers to divide the symptoms into various stages, the simplest being (1) primary fever; (2) jaundice; (3) secondary fever. The first stage lasts from three to five days, the jaundice from seven to nine days, and the secondary fever again from seven to nine days, making a total duration of about three weeks. In a typical case the fever usually remains between 39° and 40° C. for four days, and falls somewhat abruptly on the fifth day to between 37·5° and 38·5°. There it remains stationary until about the ninth day, when it has a third period of about four days of normal temperature, followed by about a week of the secondary fever, which oscillates between 38° in the morning and 39° at night, after which convalescence slowly begins. In some fatal cases the temperature rises to 41·5° before death, and has been found to be 42° or 43° in the rectum after death. The pulse is quick during the fever, but may be as slow as 60 in the jaundice stage. The nervous symptoms are chiefly headache, giddiness and sleeplessness, which usher in the fever and disappear with it. Delirium at night is not uncommon at the beginning, while bad cases develop somnolence, prostration, hiccough, weakness of sphincters, lividity of face, dry-

brown tongue and muscular twitchings, in fact, the "typhoid state." The muscular pains, especially at the nape of the neck and in the calves of the legs, are intense during the first stage of the disease, and are greatly increased by pressure, forming a useful diagnostic sign while one is in doubt about the nature of the illness.

Digestive Symptoms.—Patients generally complain of epigastric pain, which can usually be traced to the liver, but sometimes the pain is all over the abdomen. Nausea and bilious vomiting occur in the first stage, and constipation is the rule, but in some very severe cases diarrhœa takes its place. The stools, as might be expected, are of normal colour during the first stage and gradually become clay-coloured and even white during the jaundice stage.

Jaundice is, of course, one of the most important symptoms. It usually begins on the fourth or fifth day, but in rare cases it may appear on the third or not until the sixth or seventh day of the disease; it first appears in the conjunctiva, with bile pigment in the urine, and in a few hours spreads over the whole body, the shades being of various tensity. Some very slight cases may show little or no jaundice, and bile pigment cannot be found in the urine. In most mild cases jaundice disappears at the beginning of convalescence, but in some of the patients, who are stained almost a mahogany colour, the skin does not regain its normal tint for a month.

Hæmorrhages.—Epistaxis is the earliest and most frequent, it occurs at the end of the first stage, and may be seriously profuse. Intestinal hæmorrhage during the second stage, is, after epistaxis, the most likely to occur. Hæmatemesis was only seen six times in 300 cases in Alexandria, but to these must be added occasional instances of melæna, which may have been of gastric origin. Hæmaturia is rare, but bloody sputa, hæmorrhage from the gums and petechiæ on the skin are often seen.

Urine.—The changes in the urine in this disease are so marked that one sometimes wonders if the renal secretion does not contain the key to the mystery. During the first stage the urine, which is acid throughout, becomes scanty and of high colour, and albumen is nearly always present, but the quantity of urea is diminished. During the second stage, and more markedly in severe cases, all the above changes are accentuated. The urine diminishes in quantity till only 50 or 100 grammes are passed in the twenty-four hours, the colour becomes gradually greenish, bile pigment is seen, more albumen is present, and blood casts may be revealed by the microscope.

Now comes the urinary crisis between the seventh and ninth days, which is one of the most interesting phases of this remarkable disease, and which evidently betoken's Nature's efforts to get rid of the poison. An excessive secretion rapidly takes the place of almost complete suppression, so that patients have been known to pass on the second day of this crisis urine varying in quantity from 2 to 8 litres in the twenty-four hours, while the specific gravity may be lowered from 1022 to 1005. The albumen becomes less, the quantity of urea is increased from perhaps 15 grammes to 50 in the day, and the polyuria is continued even during the third stage of secondary fever. Leucin and tyrosin are usually absent, but they were present in one of my sporadic cases, which I half thought, during life, was one of acute yellow atrophy of the liver.

The *liver* and *spleen* are swollen and tender from the beginning, and can be felt below the ribs, their relative vertical measurement reaching to 7 inches and 5 inches respectively, but during convalescence they gradually regain their normal dimensions.

Mortality.—The official statistics of the Egyptian Government include this disease under a general heading of "fièvres typhiques," and therefore it is impossible to get any figures from the general population. But Valassopoulos has analysed all the 300 cases admitted into the Greek hospital in Alexandria from 1875 to 1901, and found an average death-rate of 32 per cent. The mortality of any one year may vary from 10 to 60 per cent., the highest figures occurring in small localised outbreaks. The death-rate is highest in the spring at the beginning of an outbreak, and lowest in summer when the epidemic is waning. But the epidemic at Nauplia, which gave a mortality of 25 per cent. on 187 cases, and lasted from June to December, reached its highest death-rate in July and August.

The disease is more fatal to stout than to thin people, and apparently to persons newly arrived in the country, and to those over 40 years of age. There was no death among thirteen cases between 16 and 20 years of age in Alexandria, and thirteen other cases at Nauplia between 8 and 20 years enjoyed a similar immunity.

As in other fevers, a patient may die at any time of some complication, or of debility caused by some co-existing disease, but ordinary fatal cases of this fever succumb between the sixth and ninth days from cardiac syncope or from uræmia.

Complications and Sequelæ.—Hyperpyrexia sometimes occurs at the beginning of the illness, the thermometer marking from 40° to 41·5°. It will easily be believed that this illness, which is nearly always severe and is followed by a protracted convalescence, urges the patient on the downward road of any disease to which he is already predisposed.

Pathology and Morbid Anatomy.

The virus seems without doubt to be introduced into the body through the alimentary tract, after which the cells of the liver and kidneys suffer most injury, accounting for the jaundice and nephritis.

Many observers in Egypt have ineffectually tried to differentiate the special organism which produces the infection. Jaegar and Nauwerck in Germany discovered the *Bacillus proteus fluorescens* which they believe to be the cause of the disease, in the urine of patients, in their bodies after death, and in ducks and geese which had died in the same locality of a fatal disease, the chief feature of which was jaundice.

Corpses usually show well-marked *rigor mortis*, the skin and mucous membranes are jaundiced, and there are often petechiæ on the skin of the trunk and limbs. Petechial hæmorrhages, not unlike those of typhus, are variously distributed on the pericardium, endocardium, pleuræ, and peritoneum. With the excep-

tion of hypostatic congestion, the lungs are apparently healthy. The heart muscle is pale, soft and flabby, and the blood is liquid and dark in colour, as in other acute infections. The liver is enlarged and shows signs of early fatty degeneration, the lobules are indistinct, the liver cells show cloudy swelling, and the portal canals are enlarged and infiltrated with lymphocytes. Some Egyptian cases examined in Paris for Valasso, poulos were described as diffuse hepatitis with fatty degeneration. The gall-bladder is sometimes empty, sometimes full; it was distended to 150 grammes in one case; when full, pressure cannot squeeze out the thick bile, though there is no visible obstruction. The spleen varies much in size, it is always hypertrophied, but cases of great enlargement are probably due to chronic malaria. Griesinger described white or yellowish grey spots scattered through most of the spleens, and these we often found in Cairo in 1899, but Valassopoulos has never seen them in Alexandria. The average weight of the spleen is about 500 grammes. The stomach shows capillary hæmorrhages in the mucous membrane, and there are sometimes ecchymoses in the ileum and colon. The kidneys also are the seat of similar hæmorrhages and are always large and congested, but the only microscopical change so far described is a slight infiltration of lymphocytes round the glomeruli. There are no changes in the brain, except a general hyperæmia of the membrane.

Dr. W. Hunter has pointed out the similarity between the jaundice of Weil's disease and that produced in dogs by toluylendiamin. This drug causes fever, swelling of liver and spleen, changes in the kidney, bile ducts distended with bile, and congestion of the duodenum.

I append condensed notes of two autopsies on my cases made at Kasr-el-Ainy by Dr. Symmers.

Case 1.—A man, aged about 24, of a pale brown colour, was found in the street by the police, semicomatose, but in a condition of slight cerebral irritation. His knee-jerks were exaggerated, and his limbs rigid, but there was no paralysis; there were no abnormal signs in the lungs or heart; the abdomen was somewhat distended and very tender about the epigastrium. He had retention of urine, constipation, and his tongue was dry, with sordes on his lips and teeth; he groaned continually, and had general jaundice, and his temperature was 37·8°, pulse 100. The liver seemed to be of normal size and did not extend below the ribs, but the spleen was much enlarged and measured 17 cm., of which 7 cm. were below the ribs. Both liver and spleen were extremely tender when touched. The urine contained bile, and was acid, but there was no albumen. He died a few hours after admission, and the *post mortem* was made the following day. The whole of the skin and mucous membranes were intensely jaundiced. The body was that of a well-nourished man, and *rigor mortis* was disappearing in the lower extremities. The pupils were dilated, and of equal size, and there were petechial hæmorrhages on the trunk, arms, thighs and legs. The pericardial sac contained two ounces of bile-stained serum, there was a considerable amount of bile-stained fat on the heart, and there were numerous petechial hæmorrhages on the epicardium; the heart was filled with large white clots, but the organs contained very fluid non-coagulated blood. The cardiac muscle was hypertrophied, the wall of the left ventricle measured from ½ inch to 1 inch in thickness, and the heart weighed 410 grammes. The lungs were bile-stained, and there were a few petechiæ on the pleuræ, otherwise normal. The whole peritoneum was much bile-stained, and there were numerous macular and petechial hæmorrhages on the parietal peritoneum. No ascites; the retroperitoneal glands were very slightly swollen. The stomach was dilated and much bile-stained, the lower part of the small intestine was very red, and apparently in a state of enteritis. The liver weighed 1,950 grammes, and was very pale and jaundiced; the gall-bladder contained thick bile. The spleen weighed 1,030 grammes, being enormously hypertrophied and very firm, and it contained a large number of yellow spots the size of pinheads. The right kidney weighed 230 and the left 240 grammes; both organs were very pale and contained a few petechial hæmorrhages under the capsules; the cut section was uniformly cream-coloured, but numerous pale pink Malpighian corpuscles could be seen. The other organs of the body were bile-stained, but apparently normal. There were no bilharzia or anchylostoma worms.

Case 2.—A Soudanese servant, aged about 45, was admitted to the hospital within eleven days of Case 1. He said that he had been ill six days, and if this be true he died on the tenth day of the disease. He complained most of jaundice, headache, constipation, tenderness over the liver, and pain in the knees and upper extremities. His tongue was covered by a thick yellowish fur; his knee-jerks were diminished. Urine, 1010 sp. gr., yellow, acid, contained much bile pigment and albumen.

Post mortem.—The body was well nourished; the mucous membranes were extremely jaundiced, but the skin was too black to see jaundice or petechiæ; *rigor mortis* present. The heart was normal, except that the epicardium presented a large number of petechial hæmorrhages, especially on the anterior surface of the right ventricle. The lungs were normal, except for a few scattered petechiæ on the pleuræ. The peritoneum and external coating of the intestines were deeply jaundiced. The liver weighed 1,950 grammes, and though swollen, did not appear abnormal on section; the gall-bladder was much distended with thick bile, which could not be squeezed out. The spleen weighed 257 grammes, the capsule showed numerous petechiæ, and in the pulp of the organ were several minute yellow spots. Each kidney weighed 225 grammes, and was swollen and very jaundiced, with numerous black petechiæ under the capsule; the cortex was very yellow from bile-staining, and was also enlarged and fatty. The other organs were normal, but bile-stained, and there were no entozoa found.

Diagnosis.

From the so-called bilious remittent fever of hot countries and from all other malarial fevers this disease can be diagnosed by the absence of Laveran's hæmatozoa. The disease, in spite of its confusing nomenclature, has no resemblance to enteric fever or

typhus, and some of the sufferers will be found to have already undergone an attack of one of these diseases. It must not be forgotten that in both enteric and typhus jaundice is a rare complication.

Yellow fever is not known in Egypt, and is essentially contagious; which Weil's disease is not.

From relapsing fever the diagnosis is not difficult, if one recognises that there are two distinct diseases, of which relapsing alone shows spirilla in the blood; no spirochæte can ever be found in the blood of infectious jaundice patients, though I must confess that I did not thoroughly believe this fact until I had the opportunity of studying the disease for myself in Alexandria. In that city there is a tendency to discover Weil's disease often (under the name of Griesinger's fever), but as I have said before, it is distinctly rare in other parts of Egypt.

Although the liver is usually enlarged in this disease, I have seen several cases where, by physical signs, it seemed evident that the liver was smaller than normal, and in such cases, especially if quite sporadic, the diagnosis of acute yellow atrophy is difficult to exclude.

So far as I can discover, the Alexandria disease is exactly the same as Weil's disease, described in Germany and England, with the solitary exception that in these countries it does not appear in the form of large epidemics, and is never endemic. This may be due to differences in climate and in local sanitation.

Prognosis.

The chief indications of real danger are an irregular feeble pulse during the first week; early and intense nervous symptoms, such as prostration, violent delirium or trembling of hands; extra deep jaundice colour; suppression of urea, much albuminuria, and the presence of blood and casts in the urine; multiple persistent hæmorrhages.

Total suppression of urine can be safely borne for a day or two, provided it is relieved by the urinary crisis.

Treatment.

At the onset of the illness intestinal antiseptics are theoretically indicated. The diet during the febrile period should consist only of milk, with the addition of large quantities of water to drink. The patient must be kept rigidly in bed, and any heart symptoms must be met by injections of strychnia hypodermically. During the second stage the quantity and quality of the urine must be carefully watched, the patient should be encouraged to drink as much water as possible, and two litres or more of artificial serum may be injected deeply under the skin to try and ward off uræmia. But if, in spite of all care, the patient is apparently dying of uræmia, venesection should be seriously considered, followed by transfusion of serum into a vein.

During the crisis, caused by the copious discharge of urine, our efforts to aid elimination are no longer necessary, but the patient will probably want extra stimulation instead.

Calomel and quinine are the drugs chiefly employed, but there is no evidence that either of them are of any avail, and the latter had better be reserved until the long convalescence, when it is very useful.

Prevention.

The little we know about this disease shows that it is produced, like so many others, by filth. In Germany attention has been drawn to the fact that butchers were chiefly affected, and various text-books have stated that it is chiefly butchers who suffer from Weil's disease; but the butchers in question probably contracted the disease because they were specially exposed to contact with carcases of animals, or to untrapped drains. Soldiers and others have fallen victims by bathing in dirty water. Those who work in drains seem peculiarly liable in certain towns, and though we know as yet little about this disease, it can safely be predicted that it need not be feared in any sanitary town. The drains of Alexandria, constructed before the English occupation by ignorant engineers, remain a disgrace to that prosperous city, and when they are thoroughly reformed and house sanitation is taken in hand infectious jaundice will probably disappear.

References.

Pruner, "*Die Krankheiten des Orients*," Erlangen, 1847, p. 381.
Veit, *Wurttemb. Med. Corresp.*, 1851, No. 10, p. 313.
Hartmann, "*Naturgeschichtlich. Med. Skizze der Nilländer*," Berlin, 1865.
Hirsch, "Geographical and Historical Pathology," London, 1883, vol. i., p. 601; vol. iii., p. 417.
Griesinger, "*Gesammelte Abhandlungen*," Berlin, 1872, p. 479.
Diamantopulos, "Icteroid Typhus of Smyrna," Athens, 1884.
Kartulis, "*Biliöse Typhoid*," Berlin, 1888.
W. Hunter, Clifford Allbutt's "System of Medicine," London, 1897, vol. iv., p. 95.
Valassopoulos, "*Typhus Bilieux*," Paris, 1902.
Stassinopoulos, "*Typhus Bilieux*," Cairo, 1903.
Medical Annual, London, 1903, p. 422.
Weil, *Deut. Archiv. fur Klin. Med.*, xxxix., p. 209.
Fraenkel, Eulenburg's "*Real-Encyclopädie der gesammten heilkunde*," Berlin, 1901, vol. xxvi., p. 153.

COLD WEATHER MOSQUITO NOTES FROM THE UNITED PROVINCES—NORTH-WEST INDIA.

By Lieut.-Col. G. M. Giles, I.M.S. (Retd.).

(*Continued from p. 2.*)

Before quitting the subject of variability of species, it may be well to note another instance which has just come under my notice. I took, the other morning, in the Police Hospital, Moradabad, three female *Nyssorhynchi*, and from the coincidence of many details of scale arrangements and other points which it would occupy too much space to specify, I feel not the least doubt that they belong to a single species.

In spite of this, one of them has the femora, &c., elaborately spotted, and is a fairly typical *N. Jamesii*, Theob., while the other two have these parts unspotted, and are fairly typical *N. fuliginosus*, Giles. I say "fairly" typical advisedly, as neither corresponds exactly in every detail, either to my own drawings or to Capt. Glen Liston's reproduced as plates iii. and iv. in the new third volume of Mr. Theobald's "Monograph," and it would not be impossible by laying sufficient stress on these differences to make them into three new species. If now these three specimens be sent

to a museum and then, after mixture with scores of other specimens coming from other collectors, they be sorted into categories, it is easy to see how a long series of specimens of each form may be got together, and how it may be difficult or impossible for the systematist, with a large collection so sorted before him, to resist the impression that he has to do not with mere varieties but with distinct species. Now in the distinction of the various forms named up to the present it must be remembered that this point of the spotting (as distinct from banding) of the femora, palpi, &c., has been made great use of as the distinguishing character between many, closely similar, so-called species. Previously to the appearance of Mr. Theobald's work I

Wing markings of an almost typical ♀ *Nyssorhynchus fuliginosus* and of the *N. Jamesii* form.

had always regarded specimens marked as those now distinguished as *N. Jamesii*, as simply variants of my *N. fuliginosus*, but the long series of specimens with spotted femora and rather lighter wings accumulated in the museum from all parts of India were so readily distinguished, that I was content to regard *N. Jamesii* as quite as well established as most species.

I now, however, return to my old opinion that *N. fuliginosus* and *N. Jamesii* are one and the same species, and am strongly inclined to suspect that *N. Theobaldi* and *N. maculipalpis* have no better claims to individuality.

The difference between the two wings is, as will be seen, very much of the same character as those already figured in the case of the dark and light varieties of *Myzomyia Rossii*. My second specimen of the darker, or *fuliginosus*, form differs again in certain details, and one of its wings wants a certain marking on the fifth longitudinal which is present on the other side. All three wings, again, it will be noted, differ from the specimens of Mr. Theobald's admitted variety, *N. palidus*, figured in the second edition of my handbook. If then the spotting of wings may vary so widely what adequate reason can there be for doubting that the markings of legs and palps may differ in the same manner? After careful examination of the form and arrangement of the scales and hairs of these specimens, I am convinced that the lighter form with spotted thighs should stand as *N. fuliginosus*, var. *Jamesii*.

In the case of the two other species suggested as also probably mere varieties, I am aware that the frontal bristles of the larva of *N. Theobaldi* are figured as differing from those of *N. fuliginosus*, the outer bristles being sparsely compound in the latter form, while it is simple in the former; but as a matter of fact these bristles vary also, as may be seen in the accompanying drawing of a larva of *A. bifurcatus* which I collected while on an excursion with Professor Celli to visit a farm on the Campagna, on which his plans for the sanitation of that notorious focus of malaria have been put into practice.

Dorsal view of head of *Anopheles bifurcatus* larva, found at Cervara, February 14, 1903.

In this specimen it will be noticed that all four frontal hairs are sparsely compound at their tips instead of being, as usually figured, simple.

I have never been able to make out any sufficient points of distinction between *Myzomyia funesta*, Mihi, and *M. Christophersi*, Theobald; and I understand from Capt. Glen Liston that he finds the larvæ of these so-called distinct species are identical, but must not further forestall a work which he has, I believe, in preparation.

In the same way, with the exception of *M. Turkhudi*, which has been shown to have eggs of quite different form from the rest, I have little doubt that four or five of the forms that so closely resemble my *M. culicifacies* are really merely variations of that species. Probably, in fact, the number of true species at present known is less than half that of the number of forms enumerated in the "Revision of the Anophelinæ" now in the press, which I have just compiled as an appendix to the second edition of my "handbook," but unfortunately this will not absolve us of the necessity of describing the various forms, if there is to be any hope of identifying the species to which they belong.

RELAPSING FEVER IN UGANDA.

By Albert R. Cook, M.D., B.Sc.Lond., B.A.Camb.
C.M.S. Hospital, Mengo.

For some reason or other relapsing fever does not find a place among the diseases described in books on Tropical Medicine (*e.g.*, it is not mentioned in Davidson or Manson). Possibly, occurring as it does in many countries in the temperate zones—Ireland, England, and Russia, for example, it is not reckoned as a so-called tropical disease. Yet it is certain that the physician practising in tropical climates should be aware of the possibility of its occurrence, else he may get seriously astray in his diagnosis. Here, as in so many other cases, the routine habit of examining the blood, either in wet or film preparations, in every case of fever coming under treatment, saves us from many pitfalls.

The attention of medical men has lately been much taken up with the study of sleeping sickness in this country, and this scourge is still desolating some of the fairest provinces of Uganda, over 48,000 deaths having been officially recorded; but almost every form of tropical disease has been, or is being, met with in this portion of the British empire, and I am therefore contributing the few notes that follow on some cases of relapsing fever that have lately been admitted into the Church Missionary Society's Hospital at Mengo.

Some 1,600 cases of so-called "fever" come under our treatment yearly, and were time always available for microscopic study of the blood in each case much valuable information could be gained. As it is, with a limited staff and an enormous amount of general surgical and medical work to get through, only the worst cases have their blood examined.

The first case that came under my notice was that of a little girl called Damali, who was admitted *in extremis* on March 21st, 1899. An examination of her blood showed it teeming with spirilla, and stained films (gentian violet) revealed the intensity of the infection. She died sixteen hours later, but a *post-mortem* was not made. Under $\frac{1}{12}$th oil immersion almost every corpuscle seemed to have at least a couple of spirilla adhering to it, and the rippling movements in the blood produced by the lashing of the spirilla reminded one of the waving of the corn when the wind blows over a cornfield.

During the next four years isolated cases were noted from time to time, but during the present month (November) a somewhat widespread epidemic seems to be raging, extending from the province of Budu in the south-west, to the borders of Kyagwe to the east. It must be remembered that only a very few of the cases will present themselves for treatment, the number of places where natives will come for medical treatment being as yet small in Uganda.

The subjoined notes refer to the case which drew my attention to the present epidemic.

Case I.—*Name:* Mundu.

Admitted into Hospital.—November 7th, 1903.

History of Present Illness.—He fell ill on November 4th, with pain in chest and vomiting. No definite history of rigor or diarrhœa.

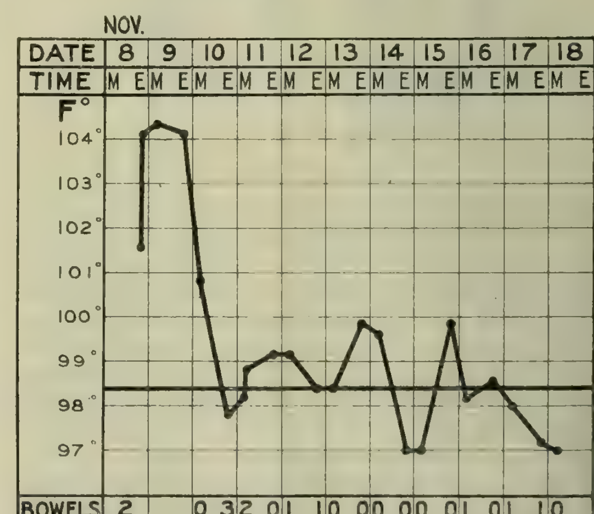
Condition on Admission.—He was in a very collapsed condition; temperature only 99·4° F., but pulse 140 and respiration 80. Brandy was given and a hypodermic injection of ♏x. of liq. strychninæ. His conjunctivæ were distinctly jaundiced (in a black man the skin shows no change in jaundice). He was delirious and in a state of carphology. The pupils were equal, moderately contracted and reacted to light.

Chest—heart, lungs, nothing abnormal; apex beat, 4th space, $1\frac{1}{2}$ inches internal to left nipple line.

Abdomen—not distended. Spleen, liver, not felt below ribs.

He had not passed his water for the previous twenty-four hours; but a catheter only drew off $2\frac{3}{4}$ oz. of urine, which was acid, of sp. gr. 1010, and showed a trace of albumen, too slight to be estimated in Esbach's albuminometer. A wet preparation of blood showed it to be teeming with *Spirillum Obermeieri*; a film stained by "Leishman" confirmed this (see accompanying figs.); over thirty could be counted in the very restricted field seen with $\frac{1}{12}$th oil immersion. Eyepiece, No. 3.

He sank rapidly, and died about four hours after admission. A *post-mortem* examination was made within three-quarters of an hour of death. The stomach and bowels were quite empty; indeed, the lack of food at his home must have played a large part in determining the fatal issue. The liver, spleen and kidneys were considerably enlarged. The spleen was engorged and very soft, the tissue breaking down readily under pressure of the finger. The capsule of the kidneys stripped off very readily. The weights of these organs are appended. Liver, 3 lb. 10 oz.; spleen 18 oz.; kidneys (together), 8 oz. From this it will be seen that they were considerably enlarged. Smears were taken from liver and spleen; but, contrary to expectation, the spirilla were not very frequent.



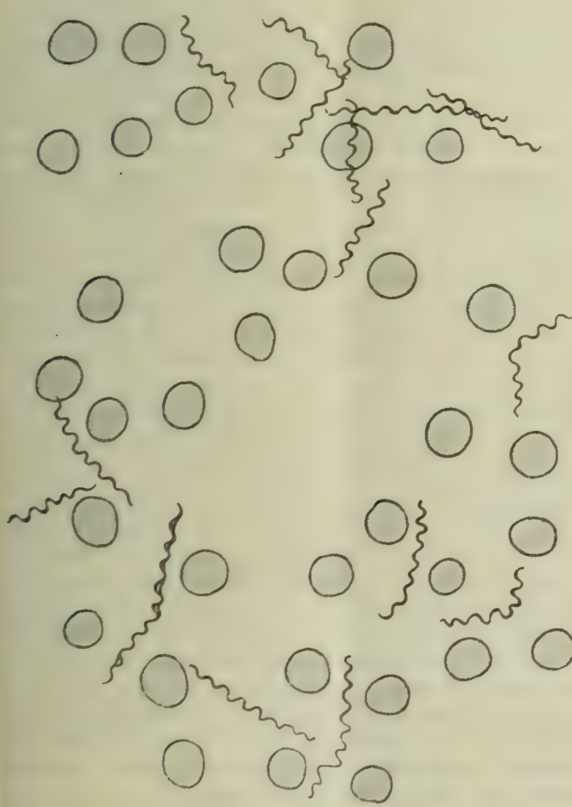
Case II. was admitted, purporting to come from the same place as Case I.; but subsequent inquiry showed that he had arrived from Budu, a district 70 miles south-west of Mengo. His name was Ente Ensibe, and he came in on November 8th with a history of

falling ill three days previously with a rigor, but had had no vomiting, diarrhœa, or pains in back or limbs.

Condition on Admission. — Temperature, 101·6° F., rapidly rising (within an hour) to 104·2, He was very confused in his mind and slightly delirious; no jaundice; nothing abnormal in chest or abdomen.

A wet preparation was made of his blood, but nothing definite was seen, and he was put on 10 gr. quin., t.d.s. Next morning his temperature remaining high (104·4°), a hypodermic injection of quinine (gr. viii. of bihydrochloride) was given with no result on the temperature. A film taken when he came in was then examined, after staining with Leishman, with the result that spirilla were found rather sparsely distributed over the preparation, perhaps one to every field with the high power. The next day the temperature abruptly fell, passing below the normal line, and the spirilla disappeared from the blood. We were awaiting the relapse with some interest, when he told us that he did not think he should have fever again, as he had had a similar attack in Budu before he came to the capital. This information we had been ignorant of. His temperature chart is appended.

A

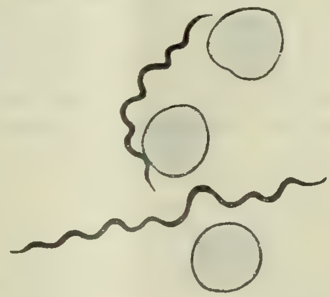


A. Oc. 3. $\frac{1}{12}$th oil imm. Lengthened tube.

CASE III. of the present series is a small girl named Sofi, who came on November 15th. She applied for treatment for bronchitis; but her temperature being raised, a film of her blood was taken, but not examined immediately, and, as the hospital was over full, she was allowed to go home. Spirilla being discovered in the blood she was sent for and readmitted four days later, and is now in the hospital undergoing treatment. A wet preparation shows the blood to be swarming with spirilla. The patient was readmitted with a temperature of 105° F., but had no jaundice, and the liver and spleen could not be felt below the edges of the ribs. She had rigors according to the mother, but no vomiting or diarrhœa. No accurate history of the case could be obtained.

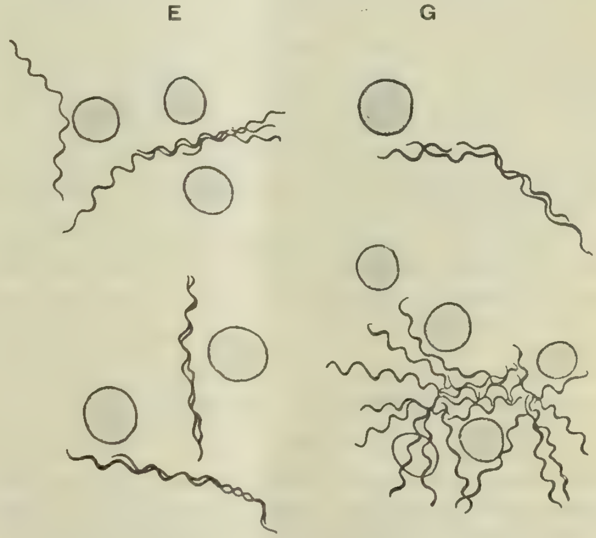
The accompanying figs. shows the appearances noticed in films from the blood of Mundu, the fatal case.

B



B. Oc. 5. $\frac{1}{12}$th oil imm. Lengthened tube.

E G



F H

E, G, F and **H.** Oc. 3. $\frac{1}{12}$th oil imm. Lengthened tube.

The film was stained with Leishman, but the tint of the corpuscles had altered in the ten days or so that had elapsed from the preparation of the film.

A is a field picked out almost at haphazard, and drawn under No. 3 eyepiece, $\frac{1}{12}$th oil immersion. It shows the intense nature of the infection. B under a higher magnifying power (1,600 diameters) shows the form and size of the individual spirilla. E, F, G, and H show groups of spirilla met with in different parts of the film, and are rather suggestive of the multiplication of the spirilla by longitudinal fission. Almost every stage was met with from a thickened spirillum, through members separated at one end, but apparently

united at the other, to a perfect tangle like that represented at H.

Diagnosis.—Here the microscope is of enormous value. In a case of moderate infection, even a $\frac{2}{3}$rd inch objective will show the corpuscles agitated by the lashing and wriggling of their adhering spirilla, and with $\frac{1}{12}$th oil immersion, which every medical man in the Tropics ought to have and to know how to use, the individual spirilla may be seen, by careful focussing, in full swing. For accurate counting stained films are essential, and, where the infection is scanty, one can detect them more easily in a stained film than in a fresh preparation.

To a beginner who had never happened to see a case there might be some confusion, when but few were present, between them and flagellated malarial parasites, but the difference in structure and form, the relatively far greater number of the spirilla and the absence of crescents, malarial parasites and pigment would all clear up the diagnosis. The organisms have a curious adhesiveness to the corpuscles, and one can often see them break off by apparently a great effort and locomote through the plasma, till sooner or later they bump against another corpuscle and adhere to it.

On looking through the back numbers of the Journal of Tropical Medicine there seem but few references to relapsing fever. An account of its serum-therapy is given in February, 1899, of its occurrence in Sumatra in June 1, 1901, and interesting papers by Christy and Nuttall (pp. 39 and 65) in 1902, as to its possible transmission by bugs. The bugs (*Luganda-bibo*) are common enough in native houses, and, as Christy has recently shown (*Brit. Med. Journ.*, Sept. 19th, 1903), have to be credited with producing a fever all of their own here, but the evidence seems scanty as yet for connecting them with relapsing fever.

Whether the present epidemic will become widespread enough to throw light on this and kindred questions remains to be seen.

FORMALIN IN LEPROSY.

By Wm. Robertson, M.D.

The following remarks are advanced in a purely tentative spirit, with a desire that the action of the remedy may be further tested by those more favourably situated as regards access to cases of leprosy.

The action of formalin in ring-worm is striking; three or four applications sufficing to eradicate the affection on skin devoid of hair. Cases of acne with infiltration of cuticle quickly yield to formalin, as do also prickly-heat, scabies, pityriasis, versicolor, &c., sand-worms, natal-sores, and all such superficial infections rapidly disappear under its use. Its penetrating power is considerable. Applied to an ulcer, pain is often experienced in the corresponding groin glands almost immediately. Used intranasally, sharp pains are at once felt in the submaxillary region. Again, it has a selective action. In leprosy, after applying it to a limb affected with slight leprous infiltration, other parts come into view previously unnoticed.

When injected into a leprous nodule, next day the nodule is replaced by a black scar, evidently showing that the nodule has been attacked alone. Absorption of the mass takes place slowly, or it suppurates; the whole operation taking place without much pain or constitutional disturbance.

The action of formalin on, *e.g.*, a simple ulcer is characteristic. On applying formalin (full strength) to an ulcer, the granulation tissue down to sound tissue is converted into a black, hard, leathery mass, corresponding to the size of the ulcer. Nothing untoward happens in the case of leprosy. Here ulceration is usually accompanied with infiltration of surrounding tissues.

The application of formalin over ulcerated surfaces and swellings soon results in subsidence of the swelling, the skin wrinkling and exfoliating. Applied to erythematous, slightly infiltrated leprous affections of the skin, the action of formalin is observed only where the leprosy exists, not on the sound skin. The erythema is there increased, but succeeding to this is soon observed a beneficial action on the diseased patch, which pales and exfoliates. The formalin has penetrated to the diseased region and inhibited the infection. In this way, very bad cases even, show a decided improvement. One patient had feet much resembling elephantiasis. Here the feet and hands became decidedly smaller, and ulcers healed over. The relief to the burning pain associated with leprosy was alleviated, and pain on moving the feet and hands relieved, so that sleep returned, and the patient, with an increased appetite due to relief from suffering, grew stronger.

In observing these leprosy cases it is forcibly obtruded on one's notice that leprosy, in any case, has been inoculated at several points; not always does it begin in the hands and feet, as is most frequent. In one case it began on the outer part of the right thigh. It may very well be supposed from analogy that a first case affects his domicile (dust-floor and bedding), which becomes for others a "locality of infection." The leprous bacillus, after a time, finds an entrance into the next subject through some lesion in hands, feet, face, &c. A native hut may soon become infected by saliva, nasal mucus, and discharge from wounds, &c., which make a nidus of infection for succeeding occupants. Judging from analogy the virus may live and multiply in the soil, even as plague does, and become almost as persistent and ineradicable.

Formalin, of course, cannot cure leprosy, but for local manifestations of the disease, within its sphere of action, it may be relied upon to considerably curtail an infection from these sources. In cases of maculo-anæsthetic leprosy pure formalin was used. In open wounds less strong solutions were employed.

Anno Noki, or Bushi, the Arrow Poison of the Ainos of Northern Japan.—Reichert, E. T., believes the poison to be an inspissated extract of the *Aconitum frischeri*.—Univ. Penn. *Med. Bull.*, Philadelphia, April, 1903.

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THE

Journal of Tropical Medicine

JANUARY 15, 1904.

ENTERIC OR TYPHOID FEVER IN THE HOT CLIMATES.

THE current number of *The Practitioner* (January, 1904) is devoted to the subject of typhoid or, as it is more commonly termed in tropical countries, enteric fever. Practitioners in warm countries will naturally turn to the section entitled "Enteric Fever Abroad," although every article, from the introduction by Sir Wm. Broadbent, to the closing chapter by Professor R. Tanner Hewlett, on Paratyphoid, will be found interesting. Dr. F. M. Sandwith's article on Enteric Fever, although referring especially to Egypt, will be found to have a general application. He bears out the statements of others in regard to the natives of the Tropics, that enteric is very rarely met with amongst the indigenous population. In Egypt and China Europeans are frequently attacked, but the natives of both countries seem to a certain extent immune. The idea that Egyptian children suffered from the disease in early years and thereby purchased immunity in after life is refuted by Dr. Sandwith's researches, in which he proved by *post-mortem* examination of many hundreds of children that, contrary to prevalent opinion, enteric plays no part in the mortality of children in Egypt. It would seem, however, when the native Egyptian is placed under conditions more or less approximating a European *régime*, as in the army, "he becomes liable to a slight amount of enteric fever while he is in contact with Europeans." Dr. Sandwith is inclined to the belief that the latrine methods employed in both British and Egyptian armies have to do with the prevalence of the disease; and, it is just possible, that the gradual introduction of European methods into towns in Egypt is accountable for the fact that enteric is more prevalent amongst Egyptian town-dwellers in recent years.

In China, Mr. Cantlie attributes the absence of enteric in epidemic form to the fact that the Chinese drink tea in place of plain water, conjee (water rice is boiled in) in place of milk, and that uncooked food in any form is seldom taken. The methods of fertilising the land in China, so frequently condemned, was discussed by the Section of Tropical Diseases at the British Medical Association at Swansea, in 1903, by Professor W. J. Simpson. By the Chinese the excreta are stored in cemented cess-pits, then allowed to ferment, and it may be several months before the resulting liquid manure is distributed on the land. By this process of manipulation the danger of direct infection is lessened, if not completely annulled, as has been amply proved in Britain.

Enteric fever in India is ably handled by Dr. Andrew Duncan, formerly of the Indian Medical Service. At one time the very existence of enteric fever in India was questioned. In regard, however, to this point the Commission appointed by the Government of India, to enquire into the excessive prevalence of enteric at Lucknow and Meerut in 1888-89, came to the conclusion that this was due, not to an absolute increase in the disease, but rather to mere

change of prevalent opinion. This means that enteric fever was not recognised until lately, but it may be that the introduction of European methods of sanitation in India, as in Egypt, brought about an increase in the disease amongst natives of India. Public water supplies and modern systems of sewerage were unknown in oriental cities until the European arrived, hence, although endemic or sporadic cases occurred and took the nature of "house-infections" amongst natives before then, there could be no general outbreak from a common source.

In all warm climates the disease seems to be more of a truly enteric nature than one indicating the typhoid state. Whether this indicates a variety in the nature of the bacillus or is merely due to environment is undetermined. Be that as it may, however, the *post-mortem* evidences of the disease are markedly similar in temperate and tropical countries, and the methods of prophylaxis whereby the disease is to be prevented are identical in every part of the globe. The other articles on "Typhoid Fever" in this issue of *The Practitioner* will well repay a close study. Dr. H. H. Tooth, C.M.G., contributes a valuable account of enteric fever in the South African war. The etiology and prevention of typhoid are ably described by Dr. George Newman and Dr. H. G. Leigh Canney. A special chapter on "Rigors in Enteric Fever" is scientifically discussed by Dr. Charles Bolton. Protective vaccination is dealt with by Dr. A. E. Wright, whose admirable work on anti-typhoid inoculation is well known. The treatment of typhoid is comprehensively given by Sir John W. Moore and Dr. Herbert P. Hawkins. Dr. Hector Mackenzie contributes an eminently practical paper entitled "On the Importance of an Early Diagnosis of Perforation in Typhoid Fever." Dr. Thomas McCrae, in an article entitled "The Treatment of Typhoid Fever in the Johns Hopkins Hospital," sums up his experiences as follows: "We strive for simplicity in the treatment of typhoid fever. A simple diet with abundance of water, the bath-treatment used systematically, and drugs given only when special indications arise, are the important points. Special attention should be given to the early recognition of abdominal complications and prompt operative treatment adopted at the earliest moment when necessary."

VESICAL CALCULI IN INDIA.

Lieut.-Col. Hatch, F.R.C.S., in a paper published in the *Indian Medical Gazette* of June, 1903, gives the following summary of the several operations practised in Bombay, and the results.

Bombay Hospitals.

	Suprapubic.	Died.	Perineal.	Died.	Litholapaxy.	Died.
1891	1	0	31	2	35	0
1892	3	2	30	7	44	1
1893	2	0	27	5	35	2
1894	1	1	20	2	43	2
1895	5	1	13	1	41	0
1896	4	1	9	0	37	3
1897	1	1	2	0	21	1
1898	5	0	5	1	41	1
1899	4	0	4	2	66	7
1900	5	2	7	2	66	3
	31	8	148	22	429	20
Mortality	25·7		16·07		4·6	

Bombay City and Presidency.

With discharged otherwise and relieved.

	Suprapubic.	Died.	Perineal.	Died.	Litholapaxy.	Died.
1881	—		484	47	23	2
1883	2	1	512	51	26	4
1884	1	0	524	36	26	2
1886	11	2	577	55	21	2
1887	6	4	604	41	40	4
1888	8	7	627	57	30	3
1889	7	6	647	62	57	5
1890	12	3	672	52	90	11

Presidency only.

	Suprapubic.	Died.	Perineal.	Died.	Litholapaxy.	Died.
1891	9	3	487	31	344	12
1892	9	1	419	39	453	28
1893	10	4	456	24	703	(?) 5
1894	6	2	391	40	448	14
1895	6	2	393	31	547	14
1896	3	1	372	49	563	12
1897	1	1	224	23	380	21
1898	18	11	309	15	545	17
1899	16	8	324	24	478	29
1900	16	2	271	18 *	612	29
	141	58	8,293	695	5,386	214
Mortality	41·1		8·3		4·01	
			Omitting 1893		4·5	

Lieut.-Col. Hatch's Cases.

	Suprapubic.	Died.	Perineal.	Died.	Litholapaxy.	Died.
	29	9	119	12	352	16
Mortality	32		11		4·7	

Sleeping Sickness in Liverpool.—Of the three cases from the Congo Free State reported to be on their way to Liverpool, one died *en route*. The two patients, now in Liverpool, arrived on December 28th, 1903. They have trypanosomes in their blood, but as yet show no signs of sleeping sickness. As has lately been suggested by Manson, however, trypanosomiasis may be really the preliminary stage of sleeping sickness.

INDIAN MEDICAL STAFF STUDENTS AT NETLEY HOSPITAL.

Steele, Macmillan, Ingram, Harris, Brierley, Maconachie, Owens, Tuohy, Burgess.
Harkness, Gill, Kelsall, Whale, Col. Macleod, Connor, Bradfield, Harvey, Hunter.

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Reviews.

Report of the Board of Health on a Second Outbreak of Plague at Sydney, New South Wales, 1902. By T. Ashburton Thompson, M.D., D.P.H. Sydney: W. A. Gullick, Printer, 1903. Pp. 80. Price 2s. 6d.

Plague prevailed at Sydney in 1899-1900, and again in 1902; an interval of fifteen months intervening between the end of the former (August 9th, 1900), and the commencement of the latter outbreak (November 14th, 1901). The 1902 epidemic consisted of 139 cases, of which 39 ended fatally, or about 28 per cent. The management of the epidemic was as follows: (1) The sick were removed to an infectious disease hospital; (2) contacts were not compelled to leave their houses; (3) infected areas were cleansed but not closed during the cleansing process. Dr. Thompson is of opinion that the rat is the infective agent in plague, and that the theory of "place infection" cannot be sustained. The distribution of plague cases in men and rats corresponded in time and in place in Sydney. When a distant focus of plague was notified, it was found that fodder had been conveyed thence from a rat-infected wharf or store. At the same time contact with plague rats was not necessary to produce the disease in man. Dr. Thompson contends that there is no evidence that man is infected by plague by means of food, but that there is "abundant, uniform, and direct" evidence that he becomes infected by inoculation, either through the broken skin or by the bite of insects, most probably fleas.

At the Zoological Gardens, Sydney, eleven animals were proved to have had plague, namely: 4 wallabies, 1 wallaroo, 1 pademelon, 1 tree kangaroo, 1 Indian antelope, 3 guinea-pigs. About the time of this outbreak 76 rats were examined at the Gardens, when 19 were found infected by plague. This is the first time that marsupial animals have been notified as suffering from plague.

Experiments were extensively made to ascertain the extracorporeal viability of the *Bacillus pestis*. This was done by soaking materials (cotton wool) in sterilised nutrient broth, on which the plague bacilli cultures were freely spread. The results showed that the bacilli were markedly influenced by drying. In rapidly dried materials the bacilli survived for less than forty-eight hours, usually twenty-four hours; under naturally dried conditions the bacilli survived from three to eleven days; in materials drying slowly, the bacilli retained their viability from one to three weeks. Excess of moisture, however, is not favourable to the continued existence of the bacilli.

The flea most prevalent on rats on the Australian coast-line is, according to Dr. Tidswell, the *Pulex pallidus*; the *Pulex fasciatus*, *Pulex serraticeps*, and *Typhlopsylla musculi* are also found on the rat. Tidswell has shown that both *P. pallidus* and *fasciatus* bite man.

The conclusions come to by Dr. Thompson are: (1) That rats are the chief infective agents in the spread of plague in man; (2) that the fleas from the plague-infected rats are capable of biting and infecting man; (3) that plague is to be guarded against by preventing the intrusion of rats into dwellings. This report by Dr. Ashburton Thompson is very complete and instructive; his conclusions are carefully reasoned out and carry conviction that the writer has given much time and thought to the study of the epidemiology of plague.

The Practical Study of Malaria and other Blood Parasites. By T. W. W. Stephens, M.D.Cantab., D.P.H., Walter Myers Lecturer in Tropical Medicine, University of Liverpool; and S. R. Christopher, M.B.Vict., I.M.S., Member of the Royal Society's Commission on Malaria in Africa and India, 1898-1902.

This work, though not so comprehensive as that of Dr. Daniels, yet contains many excellent features, and may usefully supplement the latter, so that with these two works in his laboratory, the investigator in the Tropics will find himself fully equipped. The larger part of the book is occupied with the important subject of malaria, after which blackwater fever, the hæmamœbidæ, the trypanosomata, the filaria, and various other fevers met with in the Tropics are treated.

Coming now to the main subject of the work—malaria—we find, after a preliminary chapter on the preparation of blood films, of which the *dry* is strongly recommended, and of their storage, fixing, staining—Romanowsky's and Leishman's being the ones recommended for malaria, a section on normal blood first given. The normal and abnormal constituents of the blood are detailed, and the student is thus familiarised with the ground-work of the latter. The detection of the malaria parasite is then proceeded with, and the various appearances of the parasite narrated. The student should have no difficulty in determining what species of parasite is present after reading the section relative thereto. The subsidiary signs of malaria are then considered, viz., the presence of pigmented leucocytes, and the alteration in the proportion of leucocytes: it is pointed out that in the vast majority of cases the pigment will be found in the large mononuclear leucocytes, whilst as regards the leucocytic variation, there is an obvious increase in the percentage of the mononuclear forms also in the *apyretic* periods, so that if not present at this period the strong presumption arises that the case is *not* malarial.

The authors next tell us how to prepare the tissues for the examination of the parasite, as regards preparation, fixing, storing, embedding, cutting, staining and mounting. The life-history of the malarial parasite is next given, after which the mosquito claims attention. The ovum, the larva, the nymph and the imago of the insect receive full treatment, and then the student is taught how to preserve alive and experimentally feed it. Next the manipulations necessary for its dissection are detailed, and then follows the examination of the malarial parasite in its body. In this work will also be found minute directions as to the collection and preservation of mosquitoes; as to their external anatomy, classification, habits, breeding places, &c.; whilst a very interesting chapter details the

steps to be taken in investigating the endemic malaria of any given district. The clinical study of malaria is next dealt with, but in this section we fail to see any mention of the quantitative determination of the urine which the late Dr. Charles Ralfe carried out in the Seamen's Hospital, Greenwich, some years back. The work concludes with chapters on blackwater fever, the hæmacytozoa, spirillar fever, the trypanosomidæ, and the filariæ. There is an appendix on blood-sucking fleas, one on stains, list of apparatus, &c.

In concluding this brief review, we must bear witness to the immense amount of work contained in it. As we have previously stated, the investigator furnished with the work of Dr. Daniels and that of Drs. Stephens and Christophers will find himself fully equipped.

A Pocket Dictionary of Hygiene. By C. T. Kingzett, F.I.C., and D. Homfray, B.Sc. Second edition. London: Baillière, Tindall and Cox, 1904. Pp. 112. Price 2s. 6d.

This handy compendium gives a succinct account of modern hygiene in dictionary form. The authors have succeeded in conveying valuable information in a clear and concise manner. The practitioner in the Tropics will be especially grateful for a book of the kind, for he is expected to be an authority on all matters appertaining to public health, and he will find the pocket dictionary useful for reference, so that he may be enabled to refresh his memory without a moment's delay.

The Symptoms and Pathology of Plague, with a Note on the Management of a Plague Epidemic. By E. F. Gordon Tucker, Captain I.M.S. Bombay. Pp. 85. Price 2s. net.

This author gives an account of plague, its etiology (chapter i.), clinical types (chapter ii.), prognosis, diagnosis, sequelæ (chapter iii.), and treatment (chapter iv.), in a succinct and systematic form. He distinguishes six varieties of plague, viz., bubonic, septicæmic, pneumonic, intestinal, cerebral and cellulo-cutaneous. Of the sequelæ, Tucker mentions neurasthenia, abscesses and boils, tachycardia, neuralgia, disseminated sclerosis, parotitis, ulcer of cornea, and insanity.

The main bulk of the work is devoted to the treatment of plague, and the management of a plague epidemic is fully described. This is a book of real practical value, and should be read and kept for consultation by both medical and lay workers in plague-stricken or plague-threatened districts.

Malaria Prevention in Hong Kong, 1900-1903. By J. C. Thomson, M.D. Government Report.

In 1900 Dr. Thomson states that the most common type of malaria parasite he met with was the malignant, with abundant crescent form. He also found larvæ of Culex around every house he examined. In 1901 malaria was recommended to be dealt with by draining, by the use of kerosine in pools, by protection of doors and windows by wire gauze, and by medicinal prophylaxis. The result of the campaign, ably conducted by Dr. Thomson, has been a marked reduction of malarial fevers in Hong Kong.

Notes and News.

The King Institute.—The Bacteriological Laboratory and Vaccine Institute, now being erected at Madras, is to be styled "The King Institute of Preventive Medicine," in recognition of the valuable services of Lieut.-Col. W. G. King, M.B., C.I.E., Sanitary Administrator of Madras.

The Enno-Sander Prize.—The Association of Military Surgeons of the United States offer a prize for the best essay upon "The Relation of the Medical Department to the Health of Armies." The essay must consist of not less than 10,000 and not more than 12,000 words, exclusive of tables. Three type-written copies of the essay is to be sent in by competitors with a *nom de plume*, with name in separate envelope, on or before September 10th, 1904. The prize is a gold medal, and the second prizeman will be made a Life Member of Association. Naval and Military British officers may compete.

The British Ophthalmic Hospital at Jerusalem.—This valuable institution is in want of funds. Their Majesties the King and Queen, are giving their patronage for an entertainment to be given on behalf of the Hospital at His Majesty's Theatre. During 1902, with only 16 beds available, there were 674 in-patients admitted and 6,032 new out-patients. The Hospital was started twenty-one years ago by the Order of St. John of Jerusalem in England, and subscriptions are to be sent to the Hon. Sec., British Ophthalmic Hospital, The Chancery, St. John's Gate, Clerkenwell, London, E.C.

Cholera Outbreak.—At Kerbela, a district south from Bagdad, between the 9th and 12th of December, there were 216 cases of cholera and 176 deaths from the disease.

Prevention of Malaria.—At a meeting of the Liverpool Chamber of Commerce on December 29th, 1903, a letter was read from the city authorities of Glasgow, stating that they would support a proposal to urge the Government to take steps to investigate the ravages of malaria. It appears that in addition to Liverpool and Glasgow the municipal bodies of Manchester, Sheffield and Newcastle, were prepared to further the proposal.

Administration of Chaulmoogra Oil.—H. Daulos recommends the following method of administering chaulmoogra oil as an enema: Whip with a fork 75 grams. (2½ oz.) warmed milk with 12 grams (3 drachms) chaulmoogra oil. The emulsion which results is to be given as an enema after the bowels have been moved. The oil would seem to be absorbed in the system.—*Presse Médicale*, November 14th, 1903.

Leprosy in Hawaii.—During 1903 there were 900 lepers in the Leper Settlement in Hawaii. The report says that 400 more are probably at large in Hawaiian Islands.

Malaria on Board U.S.A. War Ships.—The Surg.-Gen. of the U.S.A. Navy, in his report states that at manœuvres in 1903, at San Juan, P.R., one vessel was unable to take part in the drill, owing to the widespread prevalence of malaria amongst the crew.

Tuberculosis in the Negro.—T. D. Coleman concludes from observations made at Charleston, Atlanta, Augusta and New Orleans, that the death-rate from tuberculosis is about twice as great in the coloured as in the white race.—*Boston Med. and Surg. Journ.*, December 24th, 1903.

Egypt.—The annual report of the Egyptian Lunatic Asylum, by Dr. J. Warnock, for 1902, has just been published. The average number of resident patients was 488. The admissions included 133 cases of mania, 72 hasheesh insanity, 31 of pellagrous insanity, 14 of alcholic insanity, and 15 cases of general paralysis. The deaths in the asylum numbered 67, of which general paralysis caused 10 deaths, dysentery 7, and tuberculosis 7. The Asylum is the only hospital for the insane in Egypt and is totally inadequate to the requirements of the community. Dr. H. W. Dudgeon has been appointed Deputy Superintendent to the Asylum.

Warburg's Tincture. — The *National Formulary* gives the formula of Warburg's tincture *without aloes* as follows:—

℞.	Rhei et angelicæ sem	āā 36
	Inula, crocus et fœniculi	āā 18
	Gentianæ, zedoariæ, agaric blanc, cubebæ, camphoræ, myrrhæ ..	āā 9
	Quininæ sulphatis	100
	Alcoholis dil. (U.S.P.) .. .. qs. ad	5000

This differs somewhat from the original formula *with aloes* published by the London *Lancet* about twenty years ago. The aloes was found objectionable because of bitterness and cathartic action.—*Clin. Record*, October, 1903.

Siam. Medical Officer of Health.—We congratulate Hugh Campbell Highet, M.D.(Glasg.), D.P.H., upon being appointed Medical Officer of Health, under the Siamese Government, to the City and Port of Bangkok. Dr. Highet and Dr. P. A. Nightingale, Dr. Highet's predecessor in Bangkok, have for many years been engaged in organising a health department for the city, and so well have their efforts been appreciated by the Siamese Government that a separate health department, with Dr. Highet as controller and director, under the ministry of local government, has been created.

This enlightened action on the part of the Siamese is to be highly commended; and considering the extensive sea-borne and inland trade of Bangkok, a great benefit to neighbouring countries is sure to follow upon Dr. Highet's appointment. Freed of private practice and its harassing encroachments on time, Dr. Highet will be able to devote his energies to the organisation of a public health service, not only for Bangkok, but for Siam.

What, no doubt, the Siamese Government is aiming at, and what we hope to see evolved in the near future, is a department of public health for the whole kingdom. The head of such a department should be a minister of the Crown or Inspector-General, with direct power and control. Practically Dr. Highet occupies such a position now, and we hope to see the department and its capable administrator attain the true position so important a branch of the public service deserves.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Children's Diseases in China.

Children's Diseases in China.—Mary V. Glenton, in the *China Medical Missionary Journal* for July, 1903, gives an interesting account of the diseases met with in practice at Wuchang, China. Of the surgical cases the following are mentioned: hip-joint diseases, Pott's curvature, cancrum oris, gangrene of "small feet" in females, scalp abscesses, dactylitis, tubercular and suppurating cervical glands, mucous patches, otorrhœa, prolapsed rectum, dysentery, cholera infantum. The skin affections mentioned are: scabies, eczema, psoriasis and tinea of the scalp.

Of medical ailments the following are stated to have been met with: cerebro-spinal meningitis (epidemic in Shanghai), enlarged spleen, dropsy (in slave girls) frequent and very fatal, scarlet fever, malaria, typhoid, beri-beri (one case in Shanghai), pneumonia, capillary bronchitis, and round worms (*Ascaris*).

Filariasis.

Filariasis.—Ashford, from observations made in Porto Rico, concludes that 12 per cent. of the people of Porto Rico have the embryos of *Filaria nocturna* circulating in their blood. The clinical evidences of infection are: (1) Elephantiasis of scrotum, of lower extremity, the penis, the female breast in upper extremity; (2) varicose groin glands; (3) orchitis; (4) chyluria; (5) hydrocele, and (6) elephantoid fever. The disease is termed "secas" by the people, and the elephantiasis is by some termed "erysipela."

Leprosy.

Leprosy in Northern Nigeria.—T. I. Tonkin, in the *Empire Review* for August and September, 1903, states that leprosy is extremely prevalent in Northern Nigeria. Less than 10 per cent. of the children of leper parents developed the disease. In only 10 per cent. was it possible to trace hereditary influence.

Literary References.

TROPICAL DISEASES.

ANKYLOSTOMIASIS (UNCINARIASIS).

Adami, J. G. On Ankylostomiasis or Uncinariasis; a review, *Montreal Med. Jour.*, 1903, vol. xxxii., p. 186.

Ankylostomiasis among Miners, *Lancet*, 1903, June 27th, p. 1833.

Ashford, B. K., and **King, W. W.** A Study of Uncinariasis in Porto Rico, *Amer. Medicine*, Philad., 1903, September 12th, p. 391 and p. 431.

Barravalle, S. Sull anchilostom-anæmia dei bambini, *Progresso med.*, Turin, 1903, vol. ii., p. 37.

Boggs, T. R. Uncinariasis; Report of a Case of Infection with the American Species, *Johns Hopkins Hosp. Bull.*, 1903, vol. xiv., p. 232.

Brown, P. K. Strongyloides and Uncinaria, *Occidental Med. Times*, San. Fran., 1903, vol. xvii., p. 107.

Bruns, H. Die Gefahr der Infektion mit Ankylostoma duodenale im Grubenbetrieb, *München. Med. Wchnschr.*, 1903, vol. i., p. 474 and p. 693.

Capps, J. A. Hook Worm Disease in America, *Wisconsin Med. Journ.*, 1903, vol. i., p. 331.

Uncinariasis or Ankylostomiasis, with the Report of a Case, *Journ. Amer. Med. Assoc.*, 1903, vol. xl., p. 28.

Claytor, T. A. The Treatment of Uncinariasis, *Journ. Amer. Med. Assoc.*, August 1st, 1903.

Crisafulli, G. C. Ricerche sperimentali intorno alla patogenesi dell Anchilostomoanæmia, *Rassegna internaz de Med., Mod.* Catania, 1902-3, vol. iv., p. 33.

Evans, G. H. Uncinariasis: Report of a Case, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xl., p. 990.

Gabbi, U. On the Pathogenesis of the Anæmia of Ankylostomiasis, *Reforma. Med.*, 1903, June 24th.

Goldman, H. Die Ankylostomiasis, *Deutsche Ærtz-Zeit.*, Berlin, 1903, 97.

Grünberger, V. Beitrag zum Studium der Anchylostomiasis, *Wein. Med. Wchnschr.*, 1902, Nos. 51 and 52, p. 2478.

Guthrie, J. B. Report of a Case of Uncinariasis, *Mobile Med. and Surg. Journ.*, 1903, vol. iii., p. 549.

Hara. Zur Symptomatologie der Filaria und Anchylostomum, *Krankheit. Mitt. d. Med. Gesellsch*, Tokio, 1903, vol. xvii., p. 139.

Harris, H. F. Uncinariasis: its frequency and importance in the Southern States, *Atlanta Journ.*, 1903-4, vol v., p. 133.

Henderson, W. T. Uncinariasis, *Mobile, Med. and Surg. Journ.*, 1903, vol. ii., p. 125.

Herman, M. Contribution á l'étude de traitement de l'ankylostomasie, *Scalpel*, 1902-3, vol. lv., p. 341.

Hewlett, R. Tanner. Bacteriological Notes—Ankylostomiasis, *Journ. State Med.*, London, January, 1904.

Iberer, J. Ueber die Ankylostomagefahr in Kohlengruben, *Münch. med. Wchnschr.*, 1903, vol. i., p. 992.

Miners' Anæmia and the Prevalence of the Anchylostomum Duodenale in the Stëyerlak-Anina Colleries, *Orvosi Hetil.*, Budapest, 1903, vol. xlvii., pp. 476 and 496.

Langlois, J. P. Ankylostomiasis in France. *Presse Medicale*, November 28th, 1903.

Lemann, I. I. Importance of Uncinariasis to the Southern Practitioner, *Miss. Med. Record*, Vicksburg, 1903, vol. iii., p. 211.

Malyox, E. Le sang dans l'ankylostomasie, *Scalpel*, Liege, 1903, vol. lvi., p. 2.

Maresio. L'anchilostomiasi nel circondario di Conegliano, *Riv. veneta di Sc. Med.*, Venice, 1903, vol. xxxviii., p. 360.

Meden. Ueber Augenstörungen bei Anchylostomiasis und bei ihrer Therapie, *Centralbl. f. prakt. Augenh.*, Leipzig, 1903, vol. xxvii., p. 207.

Nagel, I. Beitrag zur Behandlung der Ankylostomiasis, *Deutsche med. Wchnschr.*, 1903, vol. xxix., p. 545.

Nakashiku and **Kurogawa.** Medicines for Ankylostomiasis, *Iji Shinbun*, Tokio, 1903, p. 260.

Pieri, G. Kurze Erwiderung auf, Dr. Looss' Mitteilung, Weiteres über die Einwanderung der Ankylostomen von der Haut aus., *Centrálblatt f. Bakteriol.*, Jena, 1903, vol. xxxiv., p. 531.

Romme, R. L'Ankylostomásie en Belgique ét le dispensaire du mineur de Liege, *Presse med.*, Par., 1903, vol. ii., p. 489.

Sakaki, I. Investigation on Poisonous Rice, *The Sei-i-Kwai Med. Journ.*, Tokio, March and April, 1903.

Smith, C. A. Uncinariasis in the South: Further Observations, *Journ. Amer. Med. Assoc.*, 1903, vol. xii., p. 709.

Smith, W. C. Intestinal Parasites, *Trans. Lucerne Med. Soc.*, 1902, and *Wilkesbarre*, 1903, vol. x., p. 21.

Spirak, C. D. Uncinaria Americana: an Intestinal Parasite, *Denver Med. Times*, 1902-3, vol. xxii., p. 583.

Steinhaus, F. Zur Bekämpfung der Anchylostomum epidemie im Ruhrkohlenbezerk, *Wien. Klin.*, Rundshaw, 1903, vol. xvii., p. 613.

Stiles, C. W. Hook Worm Disease, *Brooklyn Med. Journ.*, 1903, vol. xvii., p. 31, and *Buffalo Med. Journ.*, 1902-3, vol. xlii., p. 1047.

Stockman, R. A Case of Ankylostomiasis in Scotland, *Brit. Med. Journ.*, July 25th, 1903.

Stone, W. R. The Geographic Distribution of Uncinariasis in the United States, *Med. News*, New York, 1903, vol. lxxxii., 680-683.

Tenholt. Anchylostomiasis im Rheinischwestfälischen. Kohlenrevier, Ursache und Bekämpfung, *Ztschr. f. Med.-Beamte*, Berlin, 1903, vol. xvi., p. 297.

CORRECTION.

In the article by Dr. Jules Guiart on "Morphological Considerations on the Anterior Extremity of the Trypanosome" in the JOURNAL OF TROPICAL MEDICINE, January 1, 1904, read "Euglena" for "Englena." At the twelfth line from the end of the article read "octopus" for "crab."

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The Journal of Tropical Medicine.

CONTENTS.—FEBRUARY 1st, 1904.

Original Communications.

APPENDICITIS IN THE CHINA FLEET.

By F. H. A. Clayton, M.D., M.R.C.P.Edin.
Staff-Surgeon, R.N.

Forwarded by the courtesy of the Director-General, *Medical Department, Admiralty, and published by his permission.*

Its Exceptional Prevalence. — From information obtained from other medical officers, as well as from my own observation, it would appear that quite an unusual number of appendicitis cases come under treatment on the China station. In two ships out here, during a period of ten months, I have had at least six cases with well-marked appendicitis and several more with symptoms referable to that part of the intestinal canal, under my own care. It has, at all events, occurred with far greater frequency than upon any other station of which I have previously had experience. It is difficult to obtain definite statistics about this disease in the Navy, as it is not specifically mentioned, but in the last three blue-books, returns of the operations performed at the three large home hospitals have been included. These show 2 operations for appendicitis in 1899, 7 in 1900, and 4 in 1901, or a total of 13 in all for these three hospitals, containing probably 2,000 beds. I do not think I am at all exaggerating in putting the number of similar operations performed at the small hospitals at Wei-Hai-Wei and Hong Kong in the last three years as about a dozen, if not more. At Wei-Hai-Wei alone Staff-Surgeon Thorpe has operated on seven cases in the last two years. As there can be no doubt about diagnosis in operation cases there is considerable reason for the opinion that the disease is exceptionally prevalent out here.

Possible Etiological Factors.—The usual developmental and anatomical peculiarities predisposing to attacks are, no doubt, present in these cases as in others; but in seeking to discover special factors, one is struck by the fact that the China station is that chiefly productive of digestive and intestinal disturbances, and probably also (this may perhaps to a slight extent explain the former) that more men are affected by intestinal parasites than upon any other. The frequency with which Europeans resident in tropical countries act as hosts of ascaris and trichocephalus is a matter of common knowledge, but as far as the Navy is concerned, this station seems to be especially responsible, as is borne out by the most recent health returns. Their association with dyspeptic disturbances and with catarrhal processes in the intestine is, in my experience, quite common among men on this station, and it is of interest to note that with appendicitis out here diarrhœa rather than constipation is the rule. At the discussion at the British Medical Association meeting this year stress was made on the preliminary catarrh, and several observers have lately suggested putrefying frozen food as a factor, by the production of intestinal catarrh. The influence of this condition is supported by the fact that, although cases occur all the year round, there has, for the last two years, been a sort of epidemic prevalence at Wei-Hai-Wei in the height of the summer. At this time far more vegetable food, and especially fruit, is eaten by the men, and animal foods run more risk of decomposition. Consequently digestive troubles are far more frequent. The presence of the common intestinal parasites quite possibly plays a part in producing this catarrhal condition, and by thus lowering the natural resistance and increasing the virulence of *Bacillus coli* and the other organisms in the canal, predisposes to inflammatory processes. But there are other ways in which they may influence its occurrence. Their mechanical effects, owing to the well-known wandering habits of ascarides, must be kept in mind. Thorpe, in a case operated upon last year, discovered a dead ascaris some days later extruded from the abscess cavity, and although in this case it seems to have penetrated a necrosed patch, cases of actual perforation of the appendix have been believed to occur. The parasites may also, however, take up the *rôle* of vehicle for organisms, either by conveying them on their surface or in their intestines, as Demateis[1]

[1] *Encyclopædia Medica*, Art. "Parasites."

has shown is possible. Finally, the small erosions produced by them might readily act as the portal for the entry of organisms.

Year	Total force employed on home station	Total force employed on China station	Total No. cases under treatment in Haslar, Plymouth, and Chatham Hospitals	Total No. of cases under treatment in Hong Kong and Yokohama Hospitals
1899	48,030	8,230	13,857	537
1900	50,500	9,280	13,939	655
1901	52,250	11,850	14,301	826

No returns are available for Wei-Hai-Wei, but the total cases under treatment there probably do not average 200 a year.

1900 and 1901 were exceptional years for the China station, as the operations ashore were then being conducted. The number of men employed and the sickness has been considerably less for the last two years.

I believe that Metschnikoff has actually suggested an association between the two conditions, although I have not seen his paper on the subject. At all events, its possibility led me to make a systematic examination for ova in all cases presenting symptoms referable to the appendix. To provide a basis for comparison, the motions of patients under treatment for diarrhœa and digestive disturbances, as being especially likely to contain ova, have also been examined.

In 49 examples of the latter class of case the ova of *Ascaris lumbricoides* were discovered 18 times, while 1 contained also that of *Trichocephalus dispar*.

In 5 cases with symptoms referable to the appendix, 1 contained the ova of both parasites, while the remaining 4 contained the ova of ascaris alone; in two cases in unusually large numbers. Two other cases with slightly marked but similar symptoms contained the ova of trichocephalus alone, and in small quantity. Details of the first 5 cases are given below.

In addition, the case already mentioned, where an ascaris was extruded from the abscess cavity, may be once more referred to, while all three patients operated on by Thorpe this year have harboured ascarides. I have heard of another case in the person of a lady, who had arrived some weeks previously from England, and who developed symptoms pointing to appendix trouble and later passed round-worms.

These facts suggest either that parasites are very frequently associated with attacks of appendicitis out here, or that they may produce symptoms simulating that disease. It may be noted that G. F. Still[1] regards the appendix as the chief breeding place for threadworms in children and, according to him, the catarrhal condition set up thereby may simulate ordinary appendicitis. At all events, the subject seems worth investigating further, and it is with that view that I venture to bring it forward.

I do not know how the recent arrivals on this station compare with the ships longer in commission as regards the incidence of the disease, but both ships in which I have served, and in which cases were numerous, have been two years out here, while in November the medical officer (Fleet-Surgeon Handyside) of the "Vengeance," which has recently arrived from the Mediterranean, told me that up to that time he had had no cases.

When one remembers, however, the almost universal infection of natives with these parasites, it seems unlikely that they are alone responsible. Dr. Matignon, of the French Legation in Pekin, in a communication read by Laveran,[2] notes the great frequency of intestinal parasites among both Chinese and Europeans, and the rarity of appendicitis notwithstanding. He had, however, noted symptoms suggesting appendicular colic in three of the latter, and due to the presence of tænia. He suggests that differences in diet have a good deal to do with the immunity of Chinese. That this immunity is not, however, absolute, is proved by the returns of Dr. Hunter, the Government bacteriologist[3] at Hong Kong for 1902, which give 14 deaths from it in a total (excluding the plague and cholera outbreaks) of 1,964, and cases are noted as being numerous. Although this does not seem a very large number it shows that it does occur.

The differences in diet as suggested by Matignon may have some influence, but as far as the Navy is concerned I am more disposed to regard trauma as the additional factor. Of late years, owing to the abolition of masts and yards, and to the increasing interest taken in gunnery, the nature of the seamen's exercises have largely changed. Instead of the severe but more graduated exertion imposed upon him in sail drill and so on, he now has to undergo, day after day, the sudden jerky strains involved in such exercises as ordinary gymnastics on the bar, and in loading drill with heavy projectiles. By far the majority of my cases have occurred in ordinary or able seamen rather than in stokers or marines, and the trifling difference in age does not sufficiently account for this. Gymnastics and the loading tray suggest a very possible means of producing by injury that temporary lowering of vitality which suffices to set alight the attack for which the train has already been laid in other ways.

There has long been a general consensus of opinion that the disease is particularly apt to attack boys and young men between the ages of 10 and 30. This is precisely the period of life when gymnastics and games, such as football, involving sudden jerking strains, are most indulged in, Early youth is likewise the favourite period of life for intestinal parasites.

Details of cases in H.M.S. "Cressy," complement 720, from July 7th to November 30th.

(1) J. T., aged 23, rating able seaman. Entered on list July 14th, complaining of diarrhœa and abdominal pain. Temperature normal. In the evening temperature rose to 104° and he complained of increased pain. Marked tenderness and rigidity over right iliac fossa, the former localised to a point two inches above and in the same vertical line as the anterior superior spine. No vomiting occurred, but a distinct tumour formed and there was a leucocytosis.

[1] *British Medical Journal*, April, 1898.

[2] *Bull. de la l'Academie de Medicine.*

[3] *Hong Kong Government Gazette*, June, 1903.

He was operated on in Wei-Hai-Wei sick quarters on July 20th, two days after admission and a necrosed appendix removed. He was subsequently found to harbour ascarides.

(2) E. N., aged 22, rating able seaman. Admitted on July 26th, complaining of diarrhœa of two days' duration and of abdominal griping. Temperature 102·6°. Markedly localised tender point exactly corresponding to McBurney's point, with much muscular rigidity. No tenderness elsewhere. This considerably increased that night and his tongue became furred and dry. His motions contained numerous ova of ascaris. As the ship was going to sea he was sent to hospital on the 26th, although his condition had improved and there was no leucocytosis. He made an uninterrupted recovery without operation.

(3) S. B., aged 25, rating stoker. Admitted on September 17th, with abdominal pain and diarrhœa and some shivering and sweating, but no vomiting. Temperature 100°. His motions were found infested with ova of ascaris, and he was given santonin on the 19th. He improved after this and on the 21st passed a dead worm; but on the evening of the 22nd his temperature again rose to 101° and there was marked pain, tenderness and muscular rigidity in the right iliac fossa, and a tumour, probably contracted muscle, was distinctly palpable. He vomited two or three times, and as there was a leucocytosis and the tenderness seemed to be extending he was sent to Hong Kong Hospital. Here his temperature fell and the tumour disappeared, but he continued to pass many worms and I have since heard that he has been invalided.

The following cases have less distinctive symptoms and correspond perhaps to those described by Matignon and others.

(4) A. R., aged 23, rating ordinary seaman. Complained on July 21st of cramps in abdomen and there was well-marked tenderness over McBurney's point. Temperature 99°. On the 22nd he passed a round-worm and his motions were found full of the ova of both ascaris and trichocephalus. He rapidly improved.

(5) A. S., aged 24, rating ordinary seaman. Came on August 21st, complaining of a heavy painful feeling in right iliac fossa. There was slight rigidity of muscles and tenderness over McBurney's point. Temperature 99·4°. Bowels confined. Tongue dry. No vomiting. The ova of ascaris were found in his motions and a differential blood count showed an eosinophile percentage of 8 per cent. He rapidly improved.

(6) R. D., age 26, rating able seaman. Complained on September 4th that for some considerable time he had suffered from aching pain in right iliac fossa. Has attacks of "indigestion," apparently with flatulence. No colic or vomiting. Temperature normal. Distinct point of tenderness just above McBurney's point. His motions were full of the ova of ascaris and he passed three worms after santonin, when his symptoms gradually disappeared.

A CASE OF SPIRILLUM FEVER.

By Leopold G. Hill, M.R.C.S., L.R.C.P.
Church Missionary Society's Hospital, Pak-hoi, S. China.

During the past summer, in making a routine examination of the blood in all patients with pyrexia at this hospital, I came across the *Spirillum Obermeieri*. As one had not previously met with this disease at Pak-hoi, and as I am told it has not been met with in Hong Kong, neither do any of the books consulted mention it as being previously met with in China, it occurred to me a short account of this case might be of interest.

The patient, a Chinese woman, aged 65, was brought to the out-patient surgery suffering from fever and delirium, on the morning of July 13th, 1903. Her friends said she had had fever some days, but had not been shivering as in ague. Her blood was at once examined and showed many very active spirilla in the fluid.

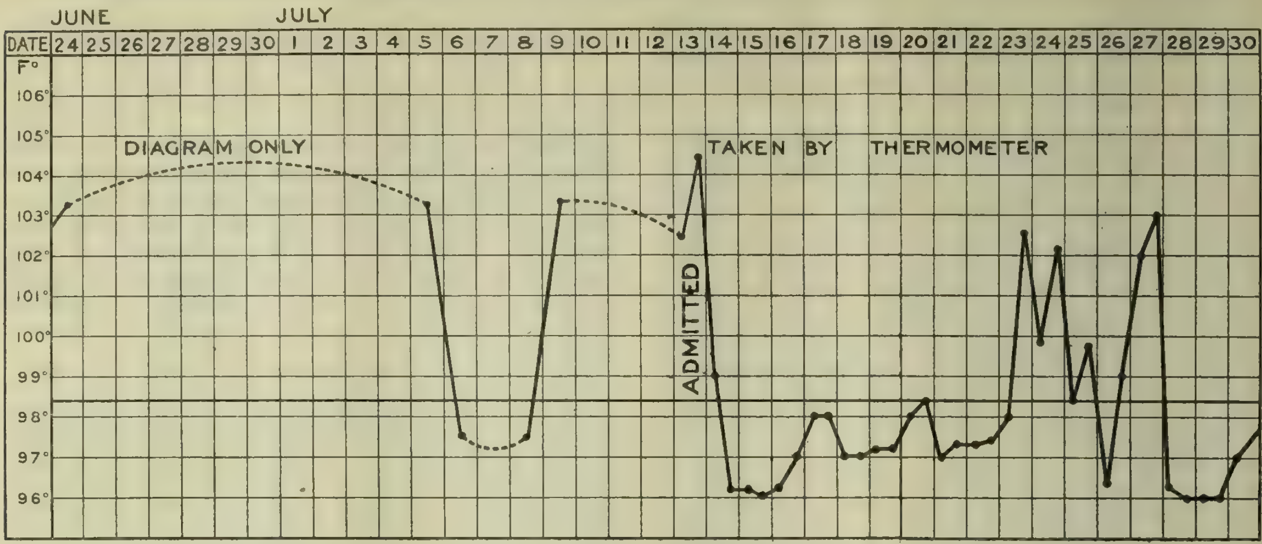
Her history, as obtained from her friends, was that she had fever on June 24th, which continued uninterruptedly till July 5th. On the 6th, 7th and 8th she had no fever. On the 9th fever reappeared and lasted till admission on the 13th. To continue the history of her fever during her stay in the hospital: From 104·2° F. on the evening of the 13th, it fell to 99° F. the following morning, the 14th, and to 96·2° in the evening. It remained subnormal till the 23rd, when at 5 p.m. it registered 102·8°, falling to 96·2° on 26th; up again to 103° on the 27th. The next morning it was subnormal, 96 2,° and continued so till she left on the 31st.

A reference to the accompanying chart will show these readings, with that obtained approximately from the history of the fever before she came to the Hospital.

Patient is very thin and ill-nourished, and in her village only eats dried potatoes, sweet potatoes and occasionally some rice gruel. She does not eat rice, fish or flesh. There is considerable scarcity in this district, not amounting to famine, but in the next province famine exists and people are dying of starvation. No one else in her house suffers from fever.

The diagnosis of famine, or spirillum fever, is based on the finding of the *Spirillum Obermeieri* in the blood, and the relapsing type of the fever. Malaria is excluded by the absence of its characteristic parasite. It will be seen that the fall of temperature by crisis was very marked; 8° in twenty-four hours on the 14th and 7° on the 28th, with a continuous subnormal temperature, both characteristic of spirillum fever.

On examining the blood on the patient's admission, one's attention was immediately arrested by finding the corpuscles being wildly whipped about, and then seeing a worm like a thread wriggle across the field. In length, roughly, they are about the circumference of a red cell. Some are single, others in bunches, and some again are curled up in a ring and inactive until touched by another, when it, too, immediately opens up and squirms about. They are visible for some hours on the fresh specimen, gradually, however, getting less active. Specimens stained (Jenner and Leishman) twenty-four hours afterwards clearly



showed the various attitudes. As regards the time for finding the spirilla, I observed them only, and in diminishing numbers, for two days after the crisis and not again till the 23rd, when the fever returned, when they were plentiful, but not so active as on the previous occasion.

The patient was supplied with good food in the Hospital, but expressed her preference for the meagre diet to which she was accustomed, viz., potatoes; I notice that famine fever has been very prevalent in Ireland formerly, in districts where potatoes formed the main diet. Although the patient was placed in a ward with others, no one else developed the fever. Pyrexia was treated with phenacetin and quinine, and her great debility with cardiac tonics.

SCARLET FEVER IN NATIVES OF INDIA.

By Wm. Robertson, M.D.

The hitherto almost unknown occurrence of scarlet fever amongst natives of India induces me to record, somewhat cursorily, an epidemic I observed some time ago. The diagnosis was acknowledged by numerous observers, whom I need not name, more especially by the appearance of the rash, and by the desquamation. In all about thirty cases came under my notice, of whom three died. The periods of incubation and invasion strictly accorded in point of time with what is observed amongst Europeans. The most apparent general character of the attack amongst these Indians was its slightness, short duration, and freedom from dangerous sequelæ. The period of invasion was characterised by the usual sharp attack of fever and quick pulse, and in twenty-four hours the appearance of the rash, which in the lighter hues of skin was as well developed and characteristic as in whites. A peculiar running together of the pigment in the skin became with me a sign of scarlet fever. This resembles a small draft-board pattern, as it gave rise to such a dark mottling of the skin, easily made out, and always present.

In no case did the throat suffer, as in whites; a transitory redness of tonsils and soft palate, with minute red patches, being all that was observed. The pulse and temperature behave as in whites.

The rash lasted five days, to be succeeded by the desquamation stage, which continued for from fourteen to twenty-one days, or more. In black skins this stage was well marked, the loose epidermis white in colour, contrasting with the black skin and looking as if the child had been dusted over with flour. The urine, examined frequently, was found in each case free from albumen. Subsequent dropsy was not observed, but it must be acknowledged that cases were never longer under my care than twenty-six or twenty-seven days. Out of these thirty cases three died, in each case from broncho-pneumonia, determined by *post-mortem* examination.

From these findings, and if we may judge from the number of cases observed, it would almost seem that the native of India has an inherent or acquired immunity from scarlet fever. It is to be observed that the salubrity of the surroundings of these cases was exceptionally good, and might, as we know it does in Europe, have modified the attack, and again, the virus originally may not have been of a malignant nature. No ear affection developed, scarlatinal buboes never, and nothing even approaching the appearance of malignant scarlet fever occurred. The impressions experienced from observing this small outbreak were:

(1) That the disease spreads with great avidity amongst Indian children, and that a proportion of adult Indians (larger than amongst whites) take it readily.

(2) That under good hygienic conditions it is a mild affection (?).

(3) That the skin of the Indians does not permit of a profuse development of toxins, and that in this way grave forms of the affection do not arise. It may be that the healthier nasopharynx observed amongst Indians withstands better the germ than in whites.

ADRENALIN CHLORIDE IN PLAGUE AND OTHER DISEASES.

By Dr. K. C. Bose, C.I.E., F.C.U.
Late President Calcutta Medical Society.

The medical profession is greatly indebted to Messrs. Parke, Davis and Co., of the U.S. of America and of London, for their placing before it a special preparation of the suprarenal body, under the name adrenalin chloride—a therapeutic agent of considerable value. For more reasons than one it has superseded all other preparations of the gland. It would, I trust, be no exaggeration to say that chloride of adrenalin would in future be highly prized by both physicians and surgeons, and be their favourite companion. I have given a fair trial to it, and am glad to be able to say that in many cases it has saved persons from almost inevitable death.

It is yet premature to write a full report on the therapeutic value of this new agent in the treatment of disease, but facts, so far as they have been gleaned from bedside observations, tend to show that it is a reliable medicine in the treatment of bubonic plague: I must candidly confess that medicines have very little effect upon plague, and within the last few years I have well nigh exhausted the store of our powerful germicides, stimulants and tonics, and yet the percentage of recovery was not more than 15 per cent., and it was only during the decline of the epidemic and under most favourable circumstances it had exceeded this record by a further 5 per cent.

I have carefully observed that deaths in plague cases are due more to cardiac failure, either the result of paresis of the muscular structures of the heart or interstitial hæmorrhage, than to anything else. In view of guarding against this complication I chiefly trusted to strychnine, digitalis and arsenic, but the results had often been discouraging.

It was about the middle of February last, when plague had already commenced its work of depredations, that I came across a pamphlet dealing with the physiological and therapeutical actions of adrenalin, and read its pages with considerable interest. Its hæmostatic action in capillary hæmorrhage was its best recommendation to induce me to try its effects upon plague.

Case 1.—Recovered. The first case I selected was a respectable Marwaree lady, aged 40, who was badly laid up with very high fever since the previous night: When I took up the case she was semi-conscious, and when roused up complained of intense headache and thirst. Her eyes were red; her temperature was 105° F.; pulse 130, dicrotic; tongue pretty moist and covered with a thin layer of creamy fur; respiration, 34; no adventitious sounds in the lungs. There was slight irregularity in the rhythmic action of the heart. No appreciable gland was detected in the neck or axillæ, but a very tender gland was felt on the left thigh. Bowels not moved since the onset of the fever; insomnia and delirium present, the patient absolutely apathetic. Three grains of calomel and 30 grains of soda were ordered at once, and drop doses of adrenalin every hour were given during day and night. On the following day her condition was found to be grave. She was unconscious and could not be roused by loudly calling out her name; no stool after the powder; passed water quite involuntarily. The same treatment was continued. Temperature 104° F.; pulse 130, pretty strong; respiration 28. In the evening the dose of adrenalin was increased to 2 drops. Belladonna and ichthyol paint over the gland was ordered. The next day no improvement was noticed; passed a miserable night; one offensive stool in the bed-clothes; increased swelling of the gland; did not answer questions but muttered some indistinct words. Improvement was noticed during evening; took her nourishment well; by significant gestures wanted the urinal; temperature 103° F.; pulse 120, very good tone; seemed to understand what was going on round her. Her condition improved very much on the following morning; passed a comfortable night; was absolutely conscious. Temperature only 101°; pulse 108; tongue still coated; pain over the gland decidedly less. From that day she continued to improve, and on the fourth day of her illness she was pronounced convalescent, and I stopped adrenalin and put her upon general tonics for a few weeks. The gland did not suppurate.

Case 2.—Recovered. Ramchunder, aged 20, came under my observation four hours after the onset of the attack. The fever came on with slight chill. Temperature 105°; eyes red; intense headache, sickness and vomiting. Pulse 130; respiration 30. He was put upon adrenalin treatment, 2 drops every hour. On the next day inguinal glands of both sides and a femoral gland on the right thigh were affected. The condition of the patient was indeed critical. He became very violent and had to be restrained. Pulse slightly better than the previous day. Adrenalin pushed on as before. On the following morning he was found to be quiet. The same treatment continued. His temperature from this day did not go high and ranged between 102° and 100°, and on the sixth day it for the first time went down to 99°, and the pains over the glands became less. From this day his progress towards recovery was uninterrupted, and after a fortnight he was allowed to sit up and discontinue adrenalin. The glands subsided.

Case 3.—Died. Chuttoo, aged 14, commenced treatment on the second day of fever. Adrenalin in drop doses continued every hour for two consecutive days, when the temperature of the patient, which was 107° before, fell to 103°; no improvement in the general condition of the patient was noticed. Left femoral gland swollen and very painful to touch. Pulse 130, dicrotic; respiration 40; pneumonic patches over both lungs; expectorations frothy mucus, slightly tinged red. The dose of adrenalin was increased to 2 drops. No improvement of symptoms. Respiration 80; pulse 160, soft. On the eighth day symptoms were grave; temperature again rose to 107°; pulse still 160, not absolutely bad; expectoration *nil*. Patient ultimately succumbed to the disease.

Case 4.—Recovered. Chuttoo's wife, aged 14, got fever a day previous to the illness of her husband. When placed under treatment her temperature was 107°, pulse 140, respiration 32. Headache, insomnia

and delirium present. Femoral glands of both sides slightly swollen and very tender to touch. Adrenalin 1-drop dose every hour, continued for two days, when the following changes were noticed: eyes less red; headache slightly present; pulse 120, pretty good; respiration 26. On the following morning an enormous swelling was noticed under the left axilla. Iodine and ichthyol paint was ordered and the dose of adrenalin was increased to 3 drops every hour, and on the sixth morning her extremities became cold, temperature fell to 96°, clammy perspiration broke out, respiration hurried, pulse bad, and her friends gave up her case as hopeless. Adrenalin ordered to be given in 5-drop doses every half-hour for four doses, and then hourly until further instruction. The next morning, to my agreeable surprise, I found the patient better, her pulse very good, 120; respiration 28; temperature 101°. Swelling over the thigh and axilla considerably gone down. Adrenalin continued every four hours, slept pretty well during the night, and although her convalescence was for a time retarded owing to the heavy bereavement she suffered from, she ultimately recovered.

Case 5.—Recovered. Brijya, aged 12, simultaneously got fever with her brother Chuttoo. Treatment commenced on the second day of fever. Temperature 105°; pulse 130; respiration 30. Left cervical gland swollen and very painful to touch. Adrenalin given in drop doses every hour for four consecutive days, when the symptoms became less alarming and the general condition of the patient improved. Swelling on the neck became very prominent and ultimately suppurated. He was operated upon and the wound took an unusually long time to heal up. He recovered with a twisted neck.

Case 6.—Recovered. A young Marwaree boy, aged 7, living with his parents at No. 31, Cotton Street, and subsequently removed to Howrah, got fever with all unmistakable symptoms of plague. Temperature 103°; pulse 120; respiration 20. Right femoral gland swollen and painful. Put upon adrenalin treatment. For the first two days there was little or no improvement of the general condition of the patient. On the third day a change for the better took place; insomnia; headache altogether gone. The boy looked bright. Adrenalin continued. The patient made good recovery. The gland did not suppurate.

Case 7.—Died. Kedar Nath, aged 35, a Brahmin, living in Cotton Street, came under my treatment on the fourth day of the fever. Adrenalin given when his temperature was 105°; pulse 140, soft and compressible, and unconscious; incontinence of urine and fæces; eyes slightly tinged; glands of both groins swollen and tender to touch; could not protrude his tongue. On the following morning his temperature fell to 103° F. Pulse better than before. Diarrhœa, to which the patient ultimately succumbed.

Case 8.—Recovered. A boy, aged 12, was placed under my care on the third day of the fever. Temperature 104·8° F.; pulse 120; respiration 30; tongue coated, clean at the tip and edges; mind clear, no headache; a black pustule on the dorsum of the left foot. Adrenalin given every hour. On the following morning pulse stronger but the temperature slightly higher than before; it was 105·4° F. Right femoral gland swollen and painful. Adrenalin continued. Three more pustules were seen to spring up from the first; they soon coalesced and formed a big bleb, which burst of its own accord and left an ulcerated surface which took some time to heal up. The gland suppurated and had to be operated on. The boy eventually made excellent recovery under adrenalin treatment.

Case 9.—Died. A Marwaree lady, aged 35, came under my treatment on the second day of fever. Temperature 103·5° F.; pulse 140, irritable; respiration 30; understands questions but cannot speak out. Left femoral gland swollen and painful under pressure, characteristic symptoms present. Adrenalin treatment commenced and the patient placed under best hygienic treatment. The next day temperature was 103°; pulse 128, good. During night alarming symptoms supervened, the patient had convulsions and became restless. Adrenalin in 2-drop doses continued. The next day the convulsions ceased. Temperature 103°; pulse pretty good. During night the temperature went high and convulsions returned, which carried her off.

Case 10.—Recovered. Roka Thakoor, aged 16, had all the characteristic symptoms of plague and placed himself under my treatment on the third day of the fever. Left inguinal gland affected. Temperature 103°; pulse 120; Adrenalin in drop doses every hour was continued. The next day the temperature came down to 101° F.; and pulse 108, good. During evening the temperature rose to 104°; pulse 130. The patient became very violent and attempted to jump down. Adrenalin continued. On the seventh day the temperature fell down to 101° F.; pulse good; no headache; no delirium; tongue moist, and pretty clean. Slept during night. No alteration was made in the line of treatment. The gland suppurated and allowed to burst of its own accord. *Débris* and slough came out, and the patient recovered after a protracted convalescence.

Case 11.—Died. Oncarmul, aged 22, commenced treatment three days after the onset of the fever. Adrenalin treatment was commenced when he was in a hopeless condition of health. Temperature 106·8° F.; pulse 140, soft and compressible; eyes red, tongue dry, respiration 60. Violently delirious and made water in bed-clothes. A femoral gland big and tender. Tremor of the muscles of the extremities. Tongue dry and thickly coated with brown fur. After the adrenalin treatment his condition slightly improved, temperature went down. Pulse less irritable than before and the patient could now talk to his friends; was less boisterous. On the ninth day, when everything was going on smoothly, a change for the worse took place. His temperature rose to 106° F., respiration became hurried, coughed up some blood, and died during night.

Case 12.—Recovered. Abhaya, a little Bengalee girl, aged 9, came under my treatment six hours after the onset of the fever. Her temperature, 105° F.; pulse 120, good; respiration 24. Cervical glands of the right side of the neck prominent and painful. Adrenalin in drop doses continued. The next day her temperature fell two degrees, but the glands became

very prominent; slight headache; no delirium. Adrenalin continued. On the seventh day temperature became normal and the girl recovered.

CASE 13.—Recovered. Married lady, aged 22, seven months advanced in pregnancy, got plague and placed herself under my treatment. Temperature 105·4° F; pulse 130, dicrotic; cervical glands swollen and tender. Adrenalin in drop doses was ordered every hour. During the night she became delirious and restless; miscarried; no bleeding whatever. Adrenalin pushed on in double doses for two more days. Temperature still continued high; pulse 112, very good; slept during night under a dose of sulphonal. Wanted something to prevent suppuration of the glands. The dose of adrenalin was reduced and the interval prolonged. On the tenth day temperature became normal and marked improvement was noticed in her general condition. From this date her temperature ranged between 98° to 101°. She took a pretty long time to recover. The gland suppurated.

CASE 14.—Died. Dr. ——, a well-known medical practitioner, aged 50, got fever, with all the characteristic symptoms of plague. He was placed under my care twelve hours after the onset of the fever. Temperature 107°; pulse 140, dicrotic; respiration 28. Lungs clear. Adrenalin in 2-drop doses continued every hour. During night his condition grew worse; diarrhœa supervened, which did not yield to medicine, and the gentleman died the next day. The dose of adrenalin in this case was increased to 3 drops every hour, but its action upon the temperature was *nil*.

CASE 15.—Recovered. A young girl, aged 17, got plague and was put under adrenalin treatment on the first day of fever. Temperature 103°; pulse 128, soft and slightly dicrotic. Left axilla slightly painful on pressure, no glands detected; headache and delirium during night. Second day no marked improvement, except slight improvement in the character of the pulse. Gland distinctly felt under the armpit. Third day temperature 103°; pulse 120, good; respiration 24; otherwise much the same. Fourth day temperature still 103°; pulse 110, very good. Fifth day temperature 100°; pulse 108; slept a little; no headache; mind clear. Sixth day, temperature normal. From this day her progress towards recovery was uninterrupted. Adrenalin in drop doses used every hour.

CASE 16.—Died. Mathura, aged 25, commenced to take adrenalin in half-drop doses every hour, on the second day of fever. Temperature 106° F.; pulse 140, soft, compressible; respiration 40. Diarrhœa of the worst type; was unconscious. Left femoral gland affected. Evening report: temperature 105; pulse 130, soft; respiration 60. Adrenalin continued; an attempt was made to check diarrhœa, but it proved ineffectual. The patient died during night.

CASE 17.—Died. Rudra, aged 18. Treatment commenced on the second day of fever. Temperature 103° F.; pulse 130; respiration 32. Diffuse bronchitis with pneumonia patches; axillary gland swollen; expectoration frothy mucus. Hæmoptysis during night. The next day temperature and pulse unchanged; passed a miserable night; low muttering; delirium; two stools watery. Adrenalin, 2 drops every hour. Died during night.

CASE 18.—Died. A young Mahomedan, aged 31, under employ of Messrs. Ebrahim Solomon and Co., came under my treatment on the second day of fever. Symptoms unmistakable. Right cervical gland affected. Understood gestures but could not reply. Mind clear; aphasia; pupils slightly dilated, sluggish; tongue dry and thickly coated. Temperature 104°; pulse 130, dicrotic; respiration 36. Put upon adrenalin treatment. The pulse slightly improved under adrenalin. The patient ultimately died.

CASE 19.—Died. Boorea, an old Mahomedan female servant, aged 60, placed upon adrenalin treatment for plague. Fever high; complete aphasia; pulse 130, moderately full; pupils normal. On the following day she opened her eyes and by movement of her hands called her son. Could not speak, although she made an attempt to do it. Adrenalin pushed on, but the patient died.

CASE 20.—Recovered. Naguria, a Marwaree boy, aged 12, got plague and was placed under adrenalin treatment on the second day of the attack. His temperature 104·4°; pulse 120, soft; respiration 20. Tremor of the hands; headache; delirium; insomnia present; had several fits of convulsions since the onset of the fever; rejected everything given by the mouth. Adrenalin hourly in drop doses continued for forty-eight hours, when a perceptible change for the better was observed. His temperature 102° F. only; pulse very good; no vomiting since the last night. Slept now and again; headache less; wandered a little; eyes only slightly tinged red; retained food and medicine very well. No alteration was made in the line of treatment, the interval only was increased, and on the ninth day the temperature became normal.

CASE 21.—Recovered. Mohadeb's daughter, aged 18, came under my treatment on the fourth day of the fever. Her temperature 103° F.; pulse 140, soft and compressible; respiration 60. Diffuse broncho-pneumonia, hæmoptysis, delirium and sickness. Adrenalin given the next day; the pulse slightly improved; no hæmoptysis; temperature and respiration same as before. During evening perspiration broke out on the forehead and the extremities were slightly cold. Adrenalin vigorously pushed on. Gradual improvement in the general condition of the patient was noticed, and on the eleventh day the patient was pronounced safe. She recovered. There was no glandular swelling in any part of the body.

CASE 22.—Recovered. Gajanan, aged 35, got plague during night. Placed under adrenalin treatment on the following morning. Temperature 103·5° F; pulse 120; respiration 32. A painful swelling under left armpit; eyes very red; headache and sickness present. On the next day the temperature was 103° F; pulse 110, pretty good; pain under the gland was acute. Retained medicine, threw out food; insomnia. Adrenalin continued, dose increased; no change within the next two days. On the seventh day temperature became normal and did not go up again. The gland suppurated and was operated upon. The wound took a pretty long time to heal up.

CASE 23.—Died. Shamdeo, aged 37, a respectable Marwaree gentleman, got plague, with symptoms all

acute; aphasia complete. On the second day of the fever adrenalin pushed on. There was temporary improvement in the general condition of the patient on the following morning. Typhoid symptoms manifested themselves during afternoon; picking at the bedclothes; carphology; restlessness, soon followed by absolute unconsciousness; stiffness of the muscles of the jaw and neck; tympanitis; coffee-ground vomiting. Died during the night.

CASE 24.—Died. Goneshdass, aged 45, suffering from plague; became speechless on the second day of fever. Adrenalin vigorously pushed on; no appreciable change was noticed within the first forty-eight hours of treatment. On the third day the temperature came down to 99° F.; pulse 110; respiration normal; took his nourishment well. During evening the fever returned and the temperature again went high, and during the night it was 107° F. Pulse 140, soft and compressible. No change of symptoms on the following morning. Adrenalin pushed on, but the patient eventually died.

CONCLUSIONS.

Now there cannot be the slightest shadow of doubt that adrenalin is a remedy which can safely be tried in cases of plague. I need hardly mention that I treated over sixty cases with simply this medicine, with results in no way unfavourable. In spite of the unsatisfactory report received from my learned friend, Lieut.-Col. Harris, M.D., F.R.C.P., of the Medical College, Calcutta, on the value of adrenalin in plague cases, I did not hesitate to give my patients the benefit of the adrenalin treatment.

From the analysis of the cases now placed before my medical brethren, one would find that adrenalin given in all stages of the pestis maintained the pulse admirably well, and that it steadily brought down the temperature. It restores the functions of the vital organs and in every way helps the patient to tide over the disease. In small and oft-repeated doses it does not irritate the stomach and the most fastidious patient can be induced to take it. In cases where the maniacal delirium of patients makes it quite a task to administer medicine regularly, adrenalin often succeeds in removing this difficulty, and it can be very freely used without upsetting the irritable temper of the sick. It is not rejected by even the most sensitive stomach. Its tonic action upon the muscles of the heart is its best recommendation for its liberal exhibition in cases of plague. In none of my cases where adrenalin was freely used had interstitial hæmorrhage, a constant concomitant evil of plague, been the cause of death. Whilst warmly advocating the cause of adrenalin I would beg leave to point out that its action upon intestinal and pneumonic plague was not at all encouraging, for out of a good number of such cases only two recovered. In bubonic plague uncomplicated with troubles of the lungs and intestine, adrenalin is a sovereign remedy and often succeeds better than any other hitherto known drug. My esteemed friend, Dr. S. M. Das, speaks from his wide experience that he has tried adrenalin upon his plague patients and derived excellent results.

ADRENALIN IN OTHER AILMENTS.

I would be failing in my duty to my profession if I did not mention that its hæmostatic action was also seen in other cases than pestis. In melæna of typhoid fever its action was simply astonishing. On one occasion I was suddenly summoned to see a case of melæna occurring on the twenty-third day of fever, and where the flux was so profuse as to render the patient almost exsanguine. On repairing to the spot I found my friend Dr. Dutt doing all that was necessary to stop hæmorrhage and prevent death if possible. As a last resource we injected solution of adrenalin *per rectum* and hypodermically; we also gave it internally by the mouth. To our agreeable surprise we noticed hæmorrhage stop all at once, and before long the radial pulse was restored and the sounds of the heart became audible. In a similar case where the hæmorrhage from the bowels was pretty large, one injection of adrenalin *per rectum* was sufficient to arrest bleeding. The patient was afterwards treated with adrenalin and he ultimately recovered. Col. R. Sanders, M.D., a physician commanding extensive practice in Calcutta, informed me that he has found adrenalin reduce the size of hypertrophied spleen quickly and most effectively.

ADRENALIN IN MALARIAL SPLEEN.

I have given a fair trial to and can confidently recommend adrenalin as a valuable auxiliary in the treatment of malarial spleen. It contracts the spleen but does not improve the general health. I selected a case with tremendous enlargement of spleen and without much cachexia. Adrenalin solution, 5 drops three times a day continued for a fortnight. The spleen was perceptibly softer and much smaller in size. Same treatment continued for another four weeks. The size of the spleen was decidedly less than before, but no improvement in the general condition of the patient was noticed. He was then put upon quinine and iron treatment for a fortnight; slight improvement in health was noticed, but the size of the spleen was just what it was two weeks before. Adrenalin was again given in 5-drop doses twice daily besides the iron mixture. The result was satisfactory. The man got well. Since then I have followed the system of treating all my spleen cases—the number being pretty large—and the result has always been satisfactory. One case requires special mention. The patient was a Bengalee youth suffering from fever and spleen for several months. He occasionally bled from the nose and gums, and on one occasion, his father said, the epistaxis was so severe that he had to take his boy to the hospital for the arrest of hæmorrhage. I examined the boy and found that he was absolutely anæmic, with a loud hæmic bruit over the chest and neck. Conjunctiva pale, gums spongy, with a tendency to bleed on pressure. Spleen hanging down below the umbilicus with a very hard, well-defined border. He was put upon the dual system of quinine, iron and adrenalin treatment. The improvement was rapid; bleeding from the gums and nose ceased a fortnight after the commencement of treatment; complete recovery in two months.

ADRENALIN IN SURGICAL PRACTICE.

Besides the use of adrenalin as an internal medicine for the treatment of diseases, its local application in surgical practice has been followed by excellent results.

I have very frequently used it in superficial oozing after operation, and the results have invariably been satisfactory. The use of adrenalin in urethral surgery is marked. Strictures due to intense congestion of the membrane rapidly yield to adrenalin. Injection of the solution of adrenalin preceded by the injection of cocaine and quinine often does wonders in cases of organic and impermeable strictures. In my practice it has on more than one occasion saved the patients from undergoing serious operation. Adrenalin when injected in the bladder after it has been thoroughly washed with a saturated solution of boric acid materially relieves pain of cystitis and prostatitis. I have also given adrenalin a fair trial in the treatment of eye diseases, and the results have been extremely satisfactory. There is no known remedy which can in any way approach adrenalin in the treatment of coryza, which at times becomes most annoying. I tried it upon myself and can confidently recommend it to the profession as the best remedy to get rid of the attack.

PRIZE ESSAYS.

Awards.

The prizes in the gift of the Journal of Tropical Medicine for essays on subjects connected with tropical diseases have been awarded as follows :—

The Belilios Prize of £10

presented by **The Hon. E. R. Belilios, C.M.G.**, for the best essay on "The System of Drainage and Sewerage (Domestic and Municipal) best suited for Tropical Climates" has been awarded to **Major F. Smith, D.S.O., R.A.M.C.**, and **Captain J. W. Cornwall, I.M.S.**, who divide the prize between them, the papers being adjudged of equal merit.

The Lady MacGregor Prize of £10

presented by **Lady Macgregor** for the best article on "A Critical Examination of the Practical Value of Anti-typhoid Inoculation" has been awarded to **Major F. Smith, D.S.O., R.A.M.C.**

The Sivewright Prize

presented by **The Hon. Sir James Sivewright, K.C.M.G., LL.D.**, for the best essay on "Intestinal Affections in Warm Climates" was not awarded.

The Judges were Sir W. Roe Hooper, K.C.S.I., Colonel Kenneth MacLeod, LL.D., Sir Patrick Manson, K.C.M.G., F.R.S., LL.D.

His Excellency Sir William McGregor, Governor of Lagos, arrived at Plymouth on January 27th.

Malaria and Mosquitoes.—In the *British Medical Journal* of August 30th, 1902, a correspondent states that in 1864 he was informed that he need have no fear of malaria in the part of Mexico he intended to traverse as there were no mosquitoes in the district, and that "where they do not exist there is no chance of malarial fever."

Business Notices.

1.—The address of the Journal of Tropical Medicine is Messrs. Bale, Sons & Danielsson, Ltd., 83-89, Great Titchfield Street, London, W.

2.—All literary communications should be addressed to the Editors.

3.—All business communications and payments should be sent to P. Falcke, Secretary to the Journal of Tropical Medicine. Cheques to be crossed London and South-Western Bank, Great Portland Street Branch, London, W.

4.—The Subscription, which is **Eighteen Shillings** per annum, may commence at any time, and is payable in advance.

5.—Change of address should be promptly notified.

6.—Non-receipt of copies of the Journal should be notified to the Secretary.

7.—The Journal will be issued on the first and fifteenth day of every month. Any delay in transmission should be immediately notified to the Secretary.

Reprints.

Contributors of Original Articles are entitled to six copies of the Journal. If reprints are required they will be supplied by the publishers, if the order is given with remittance when sending the MS. The price will be as below:—

50 Copies of four pages, 5/-;
100 ,, ,, 6/0;
200 ,, ,, 7/6;
50 Copies beyond four up to eight pages, 8/6;
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200 ,, ,, ,, 14/6.

One page of the Journal equals 3 pp. of the reprint.

If a printed cover is desired the extra cost will be for 50 Copies, 5/6; 100 Copies, 6/6; 200 Copies, 7/6.

THE

Journal of Tropical Medicine

February 1, 1904.

PLAGUE DURING 1903.

The plague mortality returns for the half year ending December 31st, 1903, which we publish in the present issue of the Journal, cannot be said to be pleasant reading, at least as far as India is concerned. In the Journal of September 1st, 1903, the plague report for the half year ending June 30th, 1903, was given, and the number of deaths then ascribed to plague in India amounted to 533,565. Combined with the figures for the half year just ended, it will be seen that during 1903 there were 846,030 deaths from plague in India. The figures for the latter half of the year, namely, 312,465, would appear to indicate that plague was subsiding, but of this there is no evidence; and with the returning spring it is to be feared the virulence of the disease will again declare itself.

In Mauritius there is no improvement on previous years; the disease shows a persistency and endemicity which seems, as our experience increases, to be the prominent feature of its nature. In Mauritius we observe deaths from influenza and lung troubles are frequently re-

ported, and it is possible that many plague cases are placed in this category. We would recommend Mauritius as an excellent field in which to study the prophylaxis of plague. The island is situated so far away from any possible sources of contamination from outside channels, except by the way of ships, that it affords a peculiarly favourable opportunity for investigating the epidemiology of plague. In the other great centres there are many difficulties. In India the whole country is more or less infected. Hong Kong is so close to, and so intimately connected with, the mainland of China that it is impossible to gauge accurately what is due to local contamination from that which is imported. In the Cape Colony also the enormous area over which scattered cases of plague occur render close and accurate investigation well nigh impossible. In Mauritius, however, there can be no importation except by known channels, and these can be watched and accurately noted. We would suggest, therefore, that the matter of the prevention of plague be seriously taken in hand in Mauritius. It is not now a question of bacteriology, but of epidemiology and prophylaxis; and in no place in the world do conditions exist where the benefits of a careful study of plague, from the points of view of epidemiology and prophylaxis, are so likely to lead to useful knowledge. An expert epidemiologist is required for the purpose, and we hope to soon hear that such an one has been deputed to investigate the matter.

In Hong Kong the deaths from plague during the first six months of the year numbered over 1,000, and during the latter half of the year only about 100. In Hong Kong the Governor (Sir Henry Blake) made an attempt to teach the Chinese how to deal with plague in their own houses, so that the troublesome and vexatious necessity of removal of contacts and suspects, &c., might be done away with. To attempt to get rid of plague on such lines as these can only end in failure; for it may be safely said that no people in the world—white or coloured—have yet attained to so high a state of civilisation, or knowledge of public health, as to render the success of such a scheme even feasible.

Plague has been reported during the latter half of 1903, in addition to the chief centres above mentioned, in the Philippines, Japan, Neuchwang (North China), several treaty ports of China, New Caledonia, Marseilles, Rio de Janiero, and Chili and Peru.

In regard to treatment, the efficacy of the various plague sera has yet to be proved. Lustig's plague serum finds a few enthusiastic supporters, amongst whom Dr. W. H. Choksey, of Bombay, is perhaps the most prominent. In a recent publication, Dr. Choksey gives details of some 130 cases in which Lustig's serum was employed by private practitioners in Bombay. Of the 130 plague patients thus treated 72 recovered and 58 died, giving a mortality rate of 46·6 per cent. Dr. Choksey regards both the Lustig and the Roux-Yersin serum as capable of considerably reducing the case mortality of plague in non-septicæmic cases, but that in septicæmic cases neither serum is of any avail. This conclusion is at variance with the reports which emanated from Glasgow and Oporto during the outbreaks of plague in these cities, the authorities holding that even in septicæmic plague the Roux-Yersin serum was curative.

The medicinal treatment of plague has been advanced a step by the exhibition of carbolic acid in heroic doses; as much as 144 grains being given in twenty-four hours in many cases of plague in Hong Kong, and it is claimed with benefit. Twelve grains of carbolic acid every two hours, not for one day but for many days, and even, in slightly lessened doses, for weeks, is so far in excess of the pharmacopœal quantity that one can hardly understand what a poisonous dose of the acid means. The treatment is claimed to have given satisfactory results.

DEATHS FROM PLAGUE, 1903.

India.

The total deaths from plague during the six months, ending December 31st, 1903, amounted to 312,465. The weekly record of deaths being as follows:—

		Deaths.
July	1—9	2,087
,,	16	2,284
,,	23	2,290
August	1	3,342
,,	8	3,613
,,	15	4,420
,,	22	6,817
,,	29	7,158
September	5	9,690
,,	12	13,088
,,	17	13,986
,,	24	13,896
October	1	13,843
,,	8	13,869
,,	15	16,204
,,	22	16,300
,,	29	18,277
November	5	17,853
,,	14	18,360
,,	21	18,329
,,	28	17,617
December	5	16,437
,,	12	17,295

		Deaths.
December	19	17,304
,,	26	15,606
,,	31	12,500
		312,465
Jan. 1 to June 30*		533,565
Total for 1903		846,030

Cape Colony.

The total deaths from plague in Cape Colony for the year 1903 were :—

January 1 to June 30*	117
July 1 to December 31	18
Total for 1903	135
Deaths from plague in Natal	30
Total in South Africa	165

Mauritius.

The total deaths from plague in Mauritius for the year 1903 were :—

January 1 to June 30*	47
July 1 to December 31	801
Total for 1903	848

Hong Kong.

The total deaths from plague in Hong Kong for the year 1903 were :—

January 1 to June 30*	1,036
July 1 to December 31	99
Total for 1903	1,135

* The record of deaths from plague in India, Cape Colony, Mauritius, and Hong Kong for the half year ending June 30th, 1903, are given in the *Journal of Tropical Medicine*, September 1st, 1903.

The London School of Tropical Medicine.—Of the Students of the above School who presented themselves for the Examination at the end of the October-December, 1903, Session, the following have passed :—

Dr. A. E. Horn (Colonial Service)
Dr. A. H. Barclay (Foreign Office)
Major Wilson (R.A.M.C.) M.B., &c.
Dr. W. J. Radford (Foreign Office)
} Passed with Distinction.

Dr. D. Cowin (Colonial Service).
Dr. J. E. Mitchell.
Dr. S. G. Ranaday.
Dr. C. H. Allan (Colonial Service).
Dr. J. T. Cartaya.
Dr. F. A. Baldwin (Colonial Service).
Dr. T. F. G. Mayer (Colonial Service).
Dr. F. C. Sutherland.
Dr. Guy Ruata.

British Medical Association.

LIVER ABSCESS, WITH TEN CASES.

By James Cantlie, M.B., F.R.C.S.

Lecturer in Surgery, London School of Tropical Medicine.

The cases of liver abscess, of which I give details, I operated upon during the past two years (1901, 1902) by trocar and cannula and siphon drainage.

Searching for Pus in the Liver.

When there is a suspicion of pus in the liver it is the duty of the practitioner at once to explore the liver thoroughly by means of an aspirating syringe. Pus may be reached by the first puncture, but if not the liver should be punctured in at least six places before coming to the conclusion that a liver abscess is not present. The number of punctures may, however, be multiplied, and in one case I made as many as twenty-four punctures during one week. It is my custom when blood flows into the syringe to draw off a quantity of blood—in all as much as 6 to 10 oz.—having learned by experience that the abstraction of blood from an inflamed liver is the readiest method of relieving hepatitis if it is present. The danger of hæmorrhage from such punctures, although it has never occurred to me, I am well aware of, as it has been mentioned by so competent a surgeon as Mr. Hatch, of Bombay. That the liver does bleed from its capsule after needle punctures I proved as follows: Whilst engaged in drawing off ascitic fluid from the abdominal cavity, I passed a needle several times into the enlarged liver of the patient. The clear ascitic fluid flowing from the cannula in the lower part of the abdomen became speedily tinged with blood; as the flow proceeded, the ascitic fluid became so markedly sanguineous that I withdrew the cannula and applied compression by a bandage firmly applied round the body over the region of the liver. No further complications occurred, and the patient was much benefited by the relief from ascitic fluid, and no doubt also by the withdrawal of blood from the congested and enlarged liver.

To obviate the danger of wounding the inferior vena cava—the only vessel likely to be wounded by a needle and thereby cause fatal or even serious hæmorrhage—I have acted upon the following anatomical observation gained by a study of frozen sections of the body made at the level of the liver: The inferior vena cava at the level of the liver is situated at (practically) equal distances from the surface along a line leading from the middle of the body in front to the angle of the ribs on the right side—the area in which a needle must be introduced in searching for pus in the liver. Now in a patient whose body measures 32 in. in circumference at the level of the seat of the intended operation, the centre of the inferior vena cava is 4½ in. from the surface. The needle, therefore, cannot be introduced without danger further than 3¾ in. in a direction from the surface of the body towards the position of the inferior vena cava. To guard against the danger of wounding this vessel, I have my needles made of

a length commensurate with this anatomical fact. When the circumference of the body is 36 in., my needle is ½ in. longer, and when 40 in., ⅝ in. longer. The diagram below will more readily explain my meaning.

It is well to have anatomical data to reassure the practitioner that he can safely puncture the liver with the precautions given. For if he hesitates to puncture the liver by a needle when he suspects pus on account of the dread of hæmorrhage, it is a serious matter, there being no signs and symptoms of pus in the liver of so definite a character, short of actually demonstrating the presence of pus by an aspirating needle, that are in any way positive. A man may have a pint of pus in his liver, and yet there may be no pain, no increase in temperature, no cough, no great loss of appetite; nothing, in fact, in his general condition to justify the conclusion that he is suffering from liver abscess; nothing short of actually finding the pus by the needle of an aspirating syringe is conclusive; and if this one

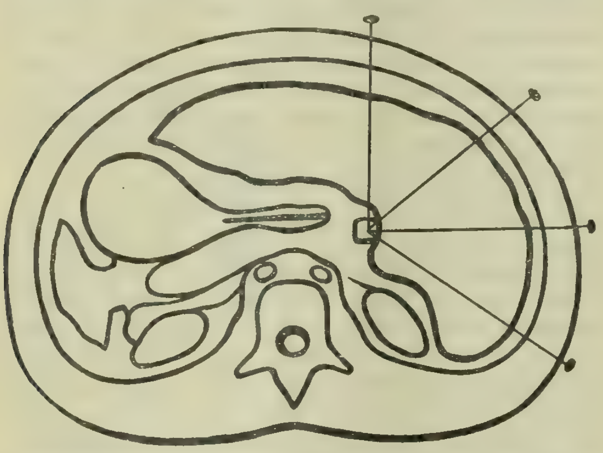

Diagram showing the inferior vena cava to be (practically) equidistant from the surface of the body at the level of the liver, anywhere in a line drawn from the xiphoid cartilage horizontally round the right side of the body as far as the angle of the ribs.

diagnostic means is withheld because of the danger of hæmorrhage, the chances of the patient being successfully treated are small. I have by anatomical data tried to remove this dread and danger.

The Use of the Trocar and Cannula.

This method has been condemned in no stinted terms by several surgeons having experience of hepatic abscess. Surgeons who practise it are accused of surgical cowardice; they are told they should look the enemy in the face, &c. These are not arguments—merely statements. Other surgeons equally competent consider that transthoracic and transabdominal incisions are over-heroic and unnecessary, and so the conflict of opinions proceeds. I have ever in my teaching kept before me the fact that medical men engaged in practice in the Tropics, and who meet with cases of liver abscesses, are in the vast majority of instances far removed from hospitals with up-to-date appliances; they may have to depend on untrained Native assistants at their operations, and on untrained male Natives to "nurse" their cases. With such surroundings, for any practitioner, however skilled, to attempt transthoracic incision, in the search for possible pus in the liver, is practically to condemn his patient to death. Given, however, a means of operation that he can do safely and speedily himself, he will not hesitate to search for and drain a liver abscess instead of wasting precious time and placing his patient's life in danger by delaying until the pus points in the epigastrium, breaks upwards through the lungs into the bowel, or takes yet more dangerous courses. If a well-appointed hospital is within fifty miles or a short voyage by sea, the practitioner, scared by the over-heroic plan of treatment, may elect to send his patient thither rather than perform abdominal section or transthoracic incisions, and thereby incur the risk of the patient succumbing *en route.*

Under any circumstances, however, I maintain that a *deep-seated* suprahepatic abscess is best treated by the trocar and cannula and siphon drainage through a large tube. Subhepatic abscesses, of which I have had experience of three, should always be operated upon by abdominal incision. If, also, the practitioner waits, or does not see the case, until the pus is pointing in the epigastrium or towards the right ribs latterly, an incision, with removal of a portion of a rib if necessary, is no doubt the better treatment; but with deep-seated abscess it is a different matter. The exposure of a liver with pus deep-seated in its substance, does not help one in locating the presence of pus in the organ; one is no wiser clinically by such a procedure, and Colonel MacLeod relates a case of a well-known surgeon (in Britain) exposing the liver by abdominal incision and finding the organ apparently healthy, closing the wound, to be told that two days afterwards his patient passed a large quantity of liver pus by the bowel. I have no hesitation in saying from the result of a considerable experience now, that for the treatment of deep-seated liver abscess (and they are all deep-seated in the early stage, when they should be operated upon) the trocar and cannula method, with ample siphon drainage, is the proper method of treatment, be the operator ever so skilled and his hospital environment of the very best.

Case 1. *Long-standing Suprahepatic Abscess: Recovery.*—B. C., European, male, aged 52. Patient states that he enjoyed good health until December 23rd, 1899, when in Durban, Natal, he had an attack of jaundice and fever for a week. During the first three months of January, 1900, he had several relapses, during which he suffered from jaundice and fever, but not so marked as on first attack. His illnesses were attributed to catarrh of stomach.

In June, 1900, whilst in Pietermaritzburg, had return of similar symptoms, diagnosed "scurvy," and afterwards "malarial jaundice." He had frequent attacks during the latter half of 1900 of rigors, fever and sweating, and always accompanied by slight but decided jaundice, lasting a few days only.

In December, 1900, came to England, having improved in health on the voyage; but after landing he had during three weeks slight attacks of illness every second day. His illness was then diagnosed

as due to gall-stones. He was put to bed and watched for five weeks, when all symptoms disappeared. Towards the end of April, 1901, pain returned to the back and the pit of the stomach. He went to hospital and an operation was proposed, but deferred. The illness he suffered from at this time was different to any he had had before, as the liver was markedly enlarged, reaching as far as the umbilicus, and he had attacks of fever lasting three or four hours, and pain on taking a deep breath. The attacks were again ascribed to gall-stones.

On June 12th, 1901, the probability that the patient was suffering from hydatids was entertained. I was asked to see the patient on June 14th with the view of operation. The patient had then a gnawing pain in right hypochondrium, an evening temperature between 100° and 101°; he was pale and emaciated, having lost weight considerably, and suffered from night sweats and sleeplessness. The liver was small; the lower border could be felt only in the epigastrium; an abnormally dull patch could be made out in the mid-axillary line.

On June 16th, having come to the conclusion that the patient was suffering from liver abscess, I operated in the usual way by trocar and cannula and siphon drainage. A few ounces of thin, light, yellow pus with a greenish tinge escaped. On June 19th I stopped siphon drainage and cut the tube short. The tube was gradually shortened, and on June 29th it was withdrawn altogether, and by July 1st the wound had healed. On July 4th the patient left for the country.

This was evidently a case primarily of hepatitis with recurrent attacks of perihepatitis. The exact date on which pus was formed is uncertain; probably an intrahepatic abscess followed the very first attack of illness, and the pus reached the surface of the liver in the mid-axillary line after some eighteen months. The appearance of the pus, the fact that but little escaped during siphonage and the speedy cure, pointed to the purulent collection as being of very long-standing, the abscess having become more or less sacculated (a condition only possible in long-standing purulent collections in the liver), and the contents had undergone degenerative changes. The patient never had dysentery or diarrhœa.

Case 2. *Suprahepatic Abscess: Recovery.*—G. K., European, male, aged 44. Patient states that he went to the West Indies in 1881. Got fever at Colon in 1895. Never had dysentery. In February, 1902, whilst in St. Thomas, West Indies, got fever, but temperature never ranged above 101° F. in the evening, and after a week's rest went to work again, although not feeling any better. He went to Barbadoes for change, and then to St. Kitts; in both places he was treated for malarial fever. He arrived in England on July 3rd, 1902, the evening temperature at that period reaching as high as 102° and 103° F. He went straight from the ship to first one and then another watering place in the North of England, where he was treated for liver and malaria. On July 17th, 1902, I saw the patient for the first time, and suspected a liver abscess. The patient, owing to the fact that he had no pain, never had dysentery, had never been told he had liver abscess, &c., begged to be allowed further treatment at one of the watering places. On July 31st patient returned to London, and on August 2nd I operated in the usual way, by trocar and cannula and siphon drainage. A pint and a half of liver pus escaped at the time of the operation. Siphon drainage was left off on August 6th, but owing to a rise in temperature, it was again applied on August 8th, and finally left off on August 12th, when a shorter tube was substituted. The patient made a complete recovery and returned to the Tropics.

Case 3. *Suprahepatic Abscess: Opened into Lung: Long-deferred Operation: Loss of Eye: Incomplete Recovery.*—E. F., European, male, aged 28. Whilst engaged in an hunting expedition in Siam the patient was suddenly seized with hepatitis and an intestinal flux, probably dysentery. He had never been in the Tropics before, and had only travelled a few weeks in the country before being taken ill. After four or five weeks, during which time he was treated whilst up-country for malaria, he came to Bangkok, where he was seen by Dr. H. G. Highet, who at once diagnosed a liver abscess, and as the patient wished to come to England for operation, he was sent on board ship. On July 13th, 1902, the patient reached London, having been very ill on the voyage. On July 14th I saw the patient for the first time, when the evidence of liver abscess was very marked. The patient was emaciated, in g eat pain, constant cough, and the expectoration had that day just become purulent and tinged with blood. Within three hours I operated, as the case was urgent, and the patient in great distress from pain, cough, high temperature, sleeplessness and impossibility to lie down. On July 14th, 1902, I operated in the usual way—trocar and cannula and siphon drainage. At the time of the operation $2\frac{1}{4}$ pints of pus escaped, and a large quantity escaped daily for seven days. The patient was speedily relieved; the siphonage was only applied at intervals after the fourth day to allow of the patient changing his position—a necessary step owing to his emaciated condition. By the twenty-first day (August 4th) all local signs had disappeared, the temperature was normal, and the patient was allowed to get up with only a small drainage tube in his side. About this time the patient observed dimness of vision in the right eye. In a few days pain succeeded, and an ophthalmologist who examined the eye pronounced it uveitis. After ten days the vision was completely lost, suppuration occurred within the eye, and the eyeball had to be removed. The stump healed well. The patient left the Nursing Home with a minute drainage in the wound in the side. In about five weeks' time pus seemed to collect in the base of the lung. The abscess tract was opened up freely, so that three fingers could be introduced. The liver was found completely healed, but a cavity existed in the base of the lung. The wound was drained and did well. The patient left for Egypt, where pus again collected in the base of the lung. Mr. Madden, Cairo, laid the wound freely open, excising a portion of two ribs. Gradually the channel closed, but the pulmonary abscess remained to give trouble when the patient returned to England. The further exact history is unknown to me.

This was a deep-seated suprahepatic abscess, causing extensive destruction of lung, owing to long-deferred operation. The loss of the eyeball was no doubt due to phlebitis of the ophthalmic vein.

(*To be continued.*)

Notes and News.

Squibbs' Cholera Mixture.—

℞.	Tinct. opii	
	Tinct. capsici	
	Spts. camphoræ .. .. āā	ℨi.
	Chloroformi	ʒiii.
	Alcoholis .. .. q. s. ad.	ℨv.
M.	Dose, 20 to 40 minims.	

—*Pennsylvania Med. Journ.*

Chloroform as a Tæniafuge.—According to Dr. Leger, in the *Medical Press*, chloroform is as efficacious in the treatment of tape-worm as male fern, &c. He uses the following mixture :—

℞.	Chloroformi	ʒi.
	Syrupi	ℨi.
	Aquæ	ℨiv.

A quarter of this is to be taken every three-quarters of an hour, and before the last dose a purgative of castor oil or tincture of jalap is given.

Insanity among Red Indians.—At Canton, S.D., where a hospital for insane red Indians was opened twelve months ago, there are thirty-four patients. Insanity is said to be increasing amongst the Indians in the reservations, presumably due to enforced civilisation amongst them.

Scientific Expedition to New Guinea.—Under the auspices of the Royal Society and the Royal Geographical Society, a scientific expedition, having for its object general scientific work, and especially ethnography, is about to take up work in British New Guinea. The members of the expedition are Major W. W. Cooke Daniels, Dr. C. C. Seligmann, Dr. W. M. Strong, and Mr. A. H. Dunning. The expedition, designated the Daniels' Ethnographical Expedition, has its headquarters at Port Moresby, New Guinea.

The American Society of Tropical Medicine.—The first public meeting was held at Houston Hall of the University of Pennsylvania, Philadelphia, on January 9th, 1904. Dr. James Carroll gave an address upon "The Etiology of Yellow Fever." Information regarding the Society, its objects, and its workings, can be had by applying to the Secretary, Dr. Joseph McFarland, Medico-Chirurgical College, Philadelphia.

The Clayton Apparatus.—Calmette, in a recent number of the *Rev. d'Hyg. Paris*, states that sulphurous acid produced by the Clayton apparatus is the best means of disinfection of large places, such as holds of ships, barracks, grain stores, libraries, &c. The Clayton apparatus produces a gas which destroys such organisms as the *Bacillus pestis*, *B. cholera*, and *B. typhosus*, and the bacterium of erysipelas. It is also efficacious in destroying insect parasites, mosquitoes and rats.

Durante's Method of Treating Tuberculous Peritonitis. Durante (of Rome) injects subcutaneously, beneath the skin of the abdomen by preference, 1 gramme daily of the following compound :—

Iodine (metallic)	1 part.
Potass. iodide	10 parts.
Guaiacol	20 ,,
Glycerine (sterilised) ..	80 ,,

This injection has been given as often as eighty times in one patient.

Disguising Quinine. Earp (*N. Y. Med. Journ.*) says that tannic acid in the proportion of 1 grain to 3 grains of quinine, with syrup of tolu as a vehicle, will successfully cover the bitterness of the quinine.

The Effect of Climatic Influences on Europeans in India and the Malay Peninsula, as Tested by Electricity. Gryns, in Java, confirms Eykman's observations concerning the reaction of the skin to electrical currents in new arrivals, and old residents in a warm climate (Java). Taking the time for the appreciation of the reaction in Europeans in Europe as 181-hundreds of a second, Gryns finds (1) that recent arrivals from Europe in a warm climate show the reaction in 187-hundreds of a second, and (2) in old residents, 214-hundreds of a second. (3) The natives of Java appreciated the stimulus in 174-hundreds of a second. Gryns is inclined to admit that prolonged residence in a tropical climate has in the case of Europeans a distinctly psychical effect.—(*Geneeskundig Tydschrift un. Nederlandsch Indie*, vol. xlii., book 3.)

Fatalities during Laboratory Experiments with Plague Bacilli.—The death of the Director of the Laboratory of the Imperial Institute of Experimental Medicine at St. Petersburg, whilst engaged in experiments on plague cultures, adds another to the list of men who have fallen victims to their devotion to scientific research. We deeply sympathise with the staff of the Institute in their great loss. It is reported also that two more of those who were at work in the laboratory have died from the same cause. We understand that the Institute is devoted wholly to the study of plague, and the preparation of an anti-plague virus. It cannot, therefore, be claimed that the efficacy of any of the plague sera is convincing, for although administered at once in the plague cases which occurred in the laboratory in Vienna some time ago, and now at the St. Petersburg laboratory, in no case did any benefit seem to result.

The Colonial Nursing Association.—This Association has, since its foundation in 1896, sent out some 200 nurses for work in the Crown Colonies and other British communities abroad. At the present time 105 nurses are at work in various parts of the Empire, and several applications have been made lately to the Association for more nurses. Towards the funds of the

Association the Goldsmiths' Company has given £50, and the Mercers' Company £10 10s. Communications should be addressed to the Honorary Secretary, Colonial Nursing Association, Imperial Institute, London.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis (Uncinariasis).

ANKYLOSTOMIASIS (UNCINARIASIS).—Warfield, L.M., states that whole communities in the Southern States, U.S., are infected by this parasite. It is the chief cause of anæmia, especially in children, and is the worst enemy to labour that a community can have. Infection no doubt arises from contamination of the hands, and later, swallowing the embryos. Ground-itch is intimately associated with ankylostomiasis. It is impossible to infect man with the ankylostomes of dogs or other animals, so that were the fæces of human beings carefully disinfected and not allowed to contaminate the soil the prophylaxis should become easy. The parasite met with in America is held to be of a special variety and has been named *Uncinaria Americana ;* the size of the eggs and parasite seem to be the only differential feature.

Filaria.

PITTALUGA states that the filaria in the dog (*F. immitis*) finds a temporary host in the Anopheles mosquito.—*Archives Latines de Médecine et de Biologie*, 1903, October.

Malaria.

MCKIBBEN, W. W., in his description of malaria and mosquitoes in Worcester, states that about five years ago a number of workmen were imported from malarial districts in Italy, and a number of malaria-infected soldiers returned to Worcester from Cuba. Around Worcester are many swamps and suitable breeding grounds for Anopheles. These acquired the malaria parasite from the infected soldiers and workmen, with the result that several of the people of the city speedily became infected.

COMPLETE absence of the spleen is reported by R. D. Saigol in the *Indian Medical Gazette*, November, 1903. The patient died of malarial fever and was found to have complete transposition of the viscera. Before death peculiar extracorpuscular elements were found in the blood of a racquet-shape ; these Saigol considers have not been described before. The immediate cause of death is ascribed to heart failure and Saigol suggests that a case of the kind ought to be described as the "syncopal form of malarial fever."

Plague.

AT the Sanitary International Conference held in Paris on October 10th and December 3rd, 1903, the question of the notification of cases of plague and cholera on ships, the measures to be taken in dealing with passengers and merchandise on ships, and the best methods of destroying the rats on board, were fully considered. A short account of the discussion will be found in *La Caducee*, 1904, January 9th.

Yellow Fever.

DRS. H. B. PARKER, G. E. BEYER and O. L. POTHIER, published a report of their investigations in yellow fever, in which they confirm the mosquito yellow fever theory.

The most interesting and striking feature of the report was the description of a protozoan parasite to which the name *Myxococcidium stegomyiæ* has been given.

Carroll from his investigations concludes that :—

(1) The fusiform stage of the so-called *Myxoccocidium stegomyiæ* of Parker, Beyer and Pothier (1903), is not connected in any way with the transmission of yellow fever.

(2) This organism appears to be not a protozoan parasite, but a yeast fungus. In its fusiform stage, the only form in which it was constantly present, it shows the characteristic budding, staining affinities and vacuolation or spore formation of a blastomycete, and it is found with considerable regularity in both male and female mosquitoes that have purposely been fed on overripe banana to which a pure culture of a wild yeast had been added in the laboratory.

(3) The organism has not hitherto been found in repeated examinations of mosquitoes of the genus *Stegomyia* that have bitten yellow fever patients in the early stages of the disease, when such insects had been fed only on blood, dry sugar and water. This statement applies also to mosquitoes that are known to have reproduced the disease in human beings.

New Books.

SERGENT, DRS. ED. AND ET., MOUSTIQUES ET MALADIES INFECTIEUSES. Masson et Gauthier-Villars.—This book, issued as one of the "Encyclopédie des Aide-Mémoires," is intended as a practical guide to the study of the mosquito. The authors describe the anatomy of the adult mosquito and the evolution of the malaria parasite in the body of the insect. M. Roux, the director of the Pasteur Institute, states in the Preface that the Doctors Sergent have produced an excellent guide to the complete study of the mosquito, and we have much pleasure in endorsing M. Roux's comment.

Literary References.

TROPICAL DISEASES.

BERI-BERI.

Adriani, P. Beri-beri en de rijstvergif-hypothese, *Geneesk. Courant*, Amsterdam, 1903, vol. lvii., p. 181.
Beri-beri en de rigoureuze disinfectie, *Geneesk. Courant*, Amsterdam, 1903, vol. lvii., p. 283.
Aoki, T. Ueber Centralskotom bei Kakke (Beri-beri), *Ophth. Klin.*, Stuttgart, 1903, vol. vii., p. 118.
Ashmead, A. L. A Method for ascertaining the presence of Carbon in the blood of Beri-beri patients; organisation, the proper treatment for Beri-beri, *Sei-i-Kwai Med. Journ.*, Tôkyô, 1903, vol. xxii., p. 103.
Beri-beri among the Chinese, *ibid.*, p. 104.
Ashmead, A. S. Was it Beri-beri? *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xl., p. 183.
Bailey, J. W. Beri-beri, a clinical study, *North-west Med.*, Seattle, 1903, vol. i., p. 75.
Bullmore, C. Notes on Beri-beri at Falmouth, *Pub. Health*, London, 1902-3, vol. xv., p. 198.
Currie, D. H. Beri-beri, or a disease closely resembling it, met in Chinese fishermen returning to San Francisco from Alaska, *Amer. Med.*, Philadelphia, 1903, vol. vi., p. 225.
Derai, K. [The Treatment of Beri beri], *Iuntendo Tji Kenkiec Kwai Zasshi*, Tôkyô, 1903, p. 108.
Destéfano, F. Beri-beri, *Exuela de Méd.*, Mexico, 1903, vol. xviii., p. 224.
Beri-beri, *Semana Méd.*, Buenos Aires, 1903, vol. x., p. 355.
Escovar, J. M. Note on a case of Beri-beri, *Lancet*, 1903, July 14th.
Glogner, M. Ueber Fragmentation der Herz und Skelettmuskulatur und Kontinuität strennungen des elastischen Gewebes bei Beri-beri sowie über das Wesen dieser Krankheit, *Virchow's Arch. of Path. Anat.* (&c), Berlin, 1903, vol. clxxi., p. 384.
Hartigan, W. The Etiology of Beri-beri; a place disease not due to rice eating, *Brit. Med. Journ.*, December 19th, 1903.
Hayward, W. F. A case of Beri-beri, *Australas. Med. Gaz.*, Sydney, 1902, vol. xxi., p. 614.
Holst, A. Some remarks on Capt. Rost's paper on Beri beri, *Ind. Med. Gaz.*, Calcutta, 1902, vol. xxxvii., p. 494.
Hulshoff Pol, D. J. Van den Burg en Van Dieren over Ratjangidjoe als Nieuw geneesmiddel tegen beri-beri, *Nederl. Tijdschr. v. Geneesk.*
Manson, Sir P. Die Prophylaxe und Behandlung von Beriberi, *Med. Woche.*, Berlin, 1993, p. 26.
McClosky, A. J. Treatment of Beri-beri with Arsenic at the District Hospital, Kuala Lumpur, Selangor, Federated Malay States, *Journ. Trop. Med.*, London, 1903, May 1st, p. 140.
Moody, D. W. K. Beri-beri among Lascar crews on board ship, *Brit. Med. Journ.*, London, 1903, March 28th, p. 728.
Ormerod, E. B. Beri-beri in Queensland, *Journ. Trop. Med.*, London, 1903, Feb. 16th, p. 54.
Petit. De l'emploi du paddy (riz non décortiqué) dans le bériberi, *Ann. d'Hyg. et de Méd. Colon.*, Paris, 1903, vol. vi., p. 98.
Sakaki, J. Investigation on the poisonous Rice, *Sei-i-Kwai Med. Journ.*, Tôkyô, 1903, vol. xxii., p. 34.
Smart, C. Beri-beri, *Rep. Surg.-Gen. Army*, Washington, 1902-3, p. 69.
Taburet. Cas de Béri-béri suraign, *Journ. de Méd. de Bordeaux*, 1903, vol. xxxiii., p. 287.
Takasu. Ueber das, Blut der an Kakke leidenden Säulinge [Ausz. Hft. 10] (Japanese text), *Mitt. d. med. Gesellsch. zu Tôkyô*, 1903, vol. xvii., p. 395.
Tiberio, V. Alcuni casi di Beri-beri osservati sulla R. Nave Volturno in Zanzibar, *Ann. di Med. Nav.*, Roma, 1903, vol i., p. 705.
Tozawa, R. [The Treatment of Beri-beri], *Iji Shinbun*, Tôkyô, 1902, p. 1933.
Urriola, C. L. Informe de la Comision nombrada por la municipalidad de Panamá sobre la epidemia de Beri-beri, *Rev. Med. de Bogotá*, 1903, p. 782.
Van Leeut, J. B. Note sur une forme miste et peu connue de béri-béri et de scorbut, avec quelques remarques sur la thérapeutic alimentaire, *Arch. de Méd. Nav.*, Paris, 1903, vol. lxxix., p. 275.
Wright, H. An Enquiry into the Etiology and Pathology of Beri-beri, London, 1903.
Yamamoto, Y. Ueber Centralskotom bei Hakke, *Ophth. Klin.*, Stuttgart, 1903, vol. vii., p. 119.
Yoshida, K. [Beri-beri and the reflex of Babinski], *Iji Shinbun*, Tôkyô, 1903, p. 97.

BILHARZIA.

Bryant, J. H. Bilharzia Hæmatobia, *Clin. Journ.*, London, 1903, vol. xxii., p. 145.
Douglas, S. R., and **Hardy, F. W.** Some Remarks on Fifty Cases of Bilharzia Disease, with Special Reference to the Characters of the White Corpuscles found in the Blood and Urine, *Lancet*, London, Oct. 31st, 1903, p. 865.
Goebel, C. Pathologisch-anatomische und klinische Bemerkungen über Bilharziakrankheit, *Arch. f. Schiffs- und Tropen Hyg.*, Leipzig, 1903, vol. vii., p. 107.
Kautsky, A. Die Bilharziaerkrankungen, *Wein. klin. Rundschan*, 1903, vol. xvii., p. 649.
Lazarus-Barlow, W. S., and **Douglas, J. J.** Preliminary Note on a Phase in the Life History of Bilharzia Hæmatobia, *Brit. Med. Journ.*, 1903, Jan. 3rd, p. 15.
Madden, F. C. A Preliminary Note on the Presence of Living Adult Bilharzia Worms in Bilharzial Papillomata and in Bilharzial Fibrous Tissue, *Journ. Trop. Med.*, London, 1903, Jan. 1st, p. 1.
Manson, Sir P. Report of a Case of Bilharzia from the West Indies, *Brit. Med. Journ.*, 1902, vol. ii., p. 1894.
Milton, F. Bilharziosis Surgically Considered, *Lancet*, 1903, March 28th, p. 866.
Petrie, J. Bilharzia hæmatobia, *Brit. Med. Journ.*, 1903, vol. ii., p. 133.
Pool, E. H. A Case of Bilharzia hæmatobia, *Proc. N. York Path. Soc.*, 1903-4, N. S. III., p. 83.
Powell, A. Bilharzia in India, *Brit. Med. Journ.*, Feb. 28th, 1903, p. 490; also *Ind. Med. Gaz.*, Nov., 1903.
Bilharzia Disease in India, Letter, *Ind. Med. Gaz.*, June, 1903.
Moot Points in Bilharziosis, *Ind. Med. Gaz.*, June, 1903.
Riddell, J. S. Case of Hæmaturia due to Bilharzia Hæmatobium, *Scot. M. and S. J.*, Edinburgh, 1903, vol. xiii., p. 55.
Russell, A. E. Eosinophilia associated with Bilharzia Disease, *Lancet*, 1902, vol. ii., p. 1540.

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The Journal of Tropical Medicine.

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Original Communications.

COLD WEATHER MOSQUITO NOTES FROM THE UNITED PROVINCES—NORTH-WEST INDIA.

By Lieut.-Col. G. M. GILES, M.B., F.R.C.S., I.M.S. (Retd.).

(*Continued from p.* 23.)

[LIEUT.-COL. GILES' previous communications on this subject will be found in the JOURNAL OF TROPICAL MEDICINE of January 1st and 15th, 1904.]

There can be no doubt that mosquitoes, in their choice of a shelter for the day, are largely influenced by the presence of human beings and also doubtless of animals—guided, presumably, by the sense of smell.

It is a noteworthy fact that the number of mosquitoes to be found in our tents increases steadily each day during a halt. Nor can this be accounted for by their accumulating, as, however numerous they may be during the heat of the day, scarcely a single specimen will be found either in the early morning or in the dusk of the evening, at which time almost all leave the tents and fly about in the open in search of food. Between eight and nine o'clock they begin to return, and may be seen flying in, one by one, and settling in the darkest corners of the tents. Moreover, without giving too great stress to a few casual observations, it is an undoubted fact that, while they lasted, mosquitoes generally, and Anophelinæ in particular, were always two or three times as numerous in the ladies' tents—although these were of much the same pattern as our own. As, however, the nights grow colder the number of mosquitoes is steadily diminishing. It is more than a week since I have met with a single *Anopheles* and the *Culices* are every day diminishing in number.

Mosquitoes also appear to soon desert buildings that are no longer inhabited. On either side of our camp in Moradabad were two unoccupied bungalows, which I examined carefully. One of these had been vacated only a day or two before by a native gentleman and his family, and the other was under repair; but in neither case, either in the main buildings or in the servants' hut belonging to them, could I discover more than one or two stray *Culices* and no *Anophelinæ*, while at the same time both kinds were fairly well represented both in our tents and in the police hospital.

With a single exception no other species than those already mentioned has been met with during our wanderings. The exception in question is a new *Corethra*, which settled on my work-table in the open, during full sunlight, the wing of which is figured below.

Wing of *Corethra Indica*, *sp. n.*

In general appearance and habit of flight it resembles much more closely a sand-fly than a true gnat; and it comes rather as a surprise, on examining it closely, to find that the venation of the wing is typically that of the *Culicidæ*. Though very hirsute, moreover it is devoid of true scales except on the internal wing-fringe, entire armature both of the body and appendages consisting almost entirely of long hairs. The following is its description:—

Corethra indica, sp. n.—Wings unspotted; legs uniformly almost snowy; antennæ white, with brown rings; abdominal segments with indistinct darker linear apical bands.

♀.—Head black; almost entirely covered with the large eyes; devoid of scales and with only scanty long hairs; proboscis dark grey; palpi black; antennæ with scanty single verticils. Thorax pale, testaceous, with median and lateral narrow dark brown lines converging behind, and two broadish lateral patches behind. These markings are formed by ground coloration, and the dark lines are fringed with long golden-brown bristles, arranged like those on the wing-veins. Wings almost snowy by reflected light; the veins

clothed with long curved hairs; fork-cells long with short stems, the base of the anterior inside that of the hinder; II. springs from I. near the base of the wing, and is, in addition, connected with it by a distinct cross vein, placed opposite the fork of V. Cross veins: 2 and 3 continuous, but at an angle with each other, while 4 is also continuous, but in the same line as 3; the internal fringe is enormously long, formed of two ranks of wavy lanceolate scales, while the third rank consists of short spiny hairs. Legs short, thickly clothed with long white hairs, second tarsal joint only a little shorter than the first; halteres snowy; abdomen grey, and with darker lines across the hind borders of the segments, which are clothed with long but scanty golden brown hairs.

Length.—About 2 mm.

Habitat.—Seondara, Moradabad district; taken near a marsh in which a single corethra larva, presumably of this species, was also found.

The venation of the wing generally much resembles that of *Mochlonynx;* but the additional cell formed by the cross vein, uniting the first and second longitudinal veins, is so distinctive that one would be quite justified in basing on this a new genus, "*Corethrinda*"; but until a number of other species presenting this peculiarity come to hand, there does not appear to be any present necessity of doing so.

Last winter while in Rome, I was shown by Prof. Celli a little appliance which greatly facilitates the collection of larvæ. It consists of a small aluminium basin, provided with a socket handle by means of which it can be fitted on to the end of a walking-stick, and with the bottom perforated with a number of very fine holes. The one he used was, I believe, specially made; but I found that there was on sale in all the principal hardware shops, a small domestic utensil in the shape of a small aluminium colander for straining vegetables, which served the purpose equally well. Its great advantage is that after making a stroke the water runs off immediately, and one can then examine the contents at leisure by partially immersing it in the water close to one, so that fresh water re-enters through the perforated bottom. By doing this, too, repeatedly, it is easy to get rid of any mud that may have been taken in during the rapid scoop that is necessary in fishing for larvæ.

The use of this little appliance has already quite revolutionised my ideas as to the distribution of larval Culicidæ in collections of water in India. Employing only the ordinary methods of collecting, I had formed the opinion that the larvæ were, practically speaking, found only in small collections of water; not, for example, in extensive marshes, but in the small pools that are always numerous in their vicinity. The truth, however, is, that in such large collections of water they are not absent, but simply few and far between, though, in view of the large area of such situations, the total number so bred must be very large. It is practically useless, however, to attempt to determine their presence by mere inspection, as owing to the number of voracious enemies that are associated with them, any larva that ventures out of cover is almost sure to be quickly snapped up. In a small puddle, on the other hand, where they may be almost alone, they remain numerous and closely packed, so that it is easy to detect them without resort to systematic fishing, and one is too apt to conclude that the same method should suffice for other and larger expanses of water.

As a result, then, of recent observations, I have come to the conclusion that the larvæ alike of *Culex* and *Anopheles* will be found in any and every collection of water, whether large or small, clean or foul, *always provided that shelter be available in the form of living plants of some sort which rise to the surface of the water.* It does not matter whether these plants be reeds, grasses, water-lilies, or what not, or even the scum of mixed filamentous algæ, diatoms, &c., which is often seen drifted into accumulations in the corners and miniature bays in open pools. Provided there be sufficient shelter wherein to hide, a sufficiently patient spell of fishing will generally yield examples of the larvæ of the principal subfamilies; and the only situations in which I have as yet utterly failed to find any are such pools and ponds as are quite open, and devoid of any vegetation showing above the surface of the water.

The principal collections of water to be met with in the plains of Northern India may be roughly enumerated as follows:—

(1) Marshes or *jhils*, usually consisting of fairly clean water; the vegetation consisting mainly of reeds, grasses, &c.

(2) Rice swamps. Usually forming the shallower part of *jhils*, and commonly continuous with them in this part of the country.

(3) Tanks or excavations at a distance from villages, usually fringed with reeds, and containing fairly clean water, but supplied by surface instead of subsoil drainage.

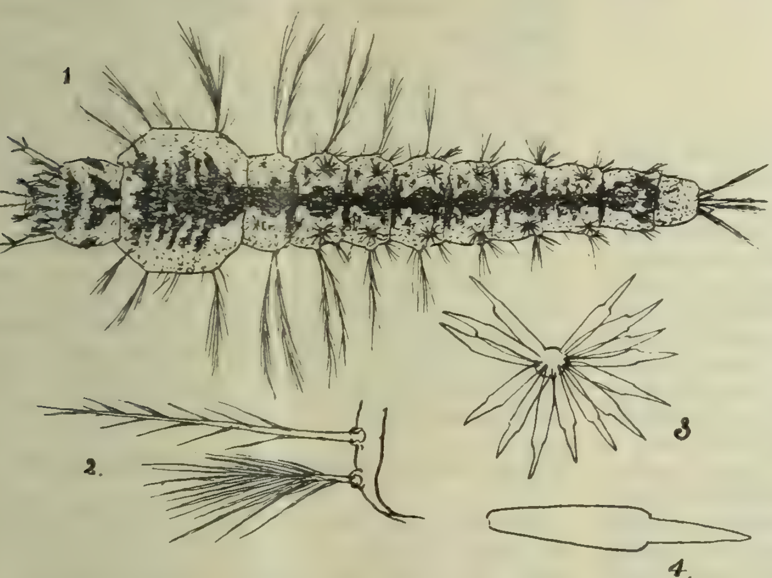
(4) Village tanks and ponds formed by the excavations necessary to obtain earth for building purposes. These tanks are necessarily situated close to the habitations, and are dreadfully foul, as the villagers habitually resort to their tanks for the purposes of nature, besides which cattle are washed and watered in them; and here, too, the *dhobi* conducts his laundry operations. A considerable proportion of its area is often devoted to the cultivation of the *singhára*, or water-nut, which is a considerable article of food in most parts of India and appears to flourish excellently in dilute sewage of this sort, though it is also capable of growing in fairly clean water.

(5) The slowly flowing streams and rivulets of the plains, the water of which is fairly clean except in the immediate vicinity of villages, and which are usually fringed with reeds and other water-plants, amongst the stems of which there is usually little or no current.

All of these it will be seen are usually fairly large collections of water, in which, from such observations as I had made in past years with the appliances then at my disposal, I had formed the opinion that mosquito larvæ were but rarely found. As a result, however, of my recent fishing operations with Prof. Celli's most useful little perforated scoop, it has become abundantly clear that each and all of them are important breeding places for mosquitoes of all sorts, and

that they form the principal wintering resorts of their larvæ.

Among the *Culicidæ* I have met with five or six species of *Culex* and *Stegomyia* larvæ which I have at present no means of identifying, as breeding out operations are impracticable under the nomadic conditions of camp life; but of the *Anophelinæ* I have only as yet met with two species of larvæ in any numbers, and of these the *Myzorhynchus* (?) larva, figured below, is by far the most common. This larva, which it will be noted, belongs almost certainly to a malaria-carrying species, is practically universal in every collection of water I have as yet examined where there is sufficient vegetation to afford cover, as I have found it not only in marshes and among the rice stubble, but also in pure water of streams which have their origin in the hills not many miles hence, and as a



(1) Larva commonly found in jhils and tanks (probably of *Myzorhynchus sinensis*); (2) frontal bristles of the same; (3) abdominal palmate tuft; (4) separate leaflet of palmate tuft.

contrast to this last habitat in the filthy dilute sewage of village *singhára* ponds; so that it is evident that the nature of the water is a matter of no importance to its well-being. It appears to feed entirely on algæ, as I have never found the remains of other larvæ of its own species or other insects in the intestinal canal.

The only other Anopheline larva I have met with up to now is that of *Myzomyia Rossii*, the larvæ of which, owing to some confusion in the labelling of my material, is wrongly figured in the second edition of my Handbook. The larvæ there figured being probably that of a Myssorhynchus. I have now, however, satisfied myself that Capt. James' figure of the larva of *My. Rossi* (with two simple frontal hairs) is correct.

I have as yet met with the wintering larva of this species in only three places. First among some grass growing in a pond in the middle of a disused trenching ground at Moradabad. The ground had not been used for trenching filth for about a year, so that the water, though doubtless rich in organic matter, was neither turbid nor actually offensive. In this spot (in November) both larvæ and pupæ, ready to burst, were found.

Subsequently larvæ of the same species were found in company with those of the *Myzorhynchus* form in the water of a large *singhára* pool, and amongst the scum drifted by the wind into a little bay in a small pond of rather turbid water. In this last instance, which is the only one I have met with of wintering larvæ being found in a situation devoid of the shelter of large plants, the larvæ were all extremely minute, presumably because the hiding place afforded by the film of mixed dirt and algæ was inadequate to shelter the larger larvæ.

I am inclined to suspect that birds, such as the wagtail and snippet are amongst the most formidable of the enemies from which the larvæ must protect themselves, if they wish to survive; and it is obvious that to protect them from the prying glances of insectivorous birds vegetation must be fairly dense and robust. On all such collections of water as are most favoured by the larvæ, the familiar and beautiful little wagtail may be seen running busily about, poising his delicate weight on the half-submerged leaves that carpet the surface of the water, and almost continuously picking up every item of living small game that comes within reach of his hungry little pointed beak; while in shooting over a swamp for snipe, one drives before one almost continuous swarms of ground larks that feed in the same manner.

Hence, while there can be no doubt that wintering larvæ play an important part in the maintenance of certain species, the number of individuals that succeed in evading their numerous persecutors through the long months of the cold weather must be comparatively small. It is the produce doubtless of these larvæ that afford the scanty numbers of adult insects that may be met with during the hot, dry months preceding the rains; but as the temperature of the air is then usually too high for the favourable development of the stage of the malarial parasite that is passed within the mosquito, but few fresh infections, as a rule, occur at this time of the year.

Recently I have met with, in a marsh, a third form of Anopheline larva, which does not correspond to any of the figures I have as yet seen. In general outline, and in the form of its abdominal palmate hairs, this larva closely resembles *My. Rossii*; but the frontal hairs differ, the simple middle ones being placed much closer together, while the outer pair are simply bifurcated some distance from the root. Between these large pairs of bristles, but originating a little in front of them, are a pair of short, curved hairs like those figured at p. 104 of the new volume of Mr. Theobald's Monograph for *Nyssorhynchus maculipalpis*, Walker; but placed between the inner and outer bristles instead

of between the widely-separated median ones, as in that species. While in no way wishing to imply that the above three forms are the only ones whose survival of the cold weather is helped by the persistence of larvæ, it appears probable that the number of species that do so is but small, as otherwise forms corresponding to some of the other twelve or fourteen species inhabiting this part of the country could hardly have failed to present themselves; and as many of these as adults are met with only during the rains, in a state of activity, many of them must pass eight or nine months in a state of torpidity.

From what has been said it is obvious that when collections of water, too large to be filled in or dealt with by means of paraffin, are situated dangerously near habitations, the clearing away of all vegetation large enough to give shelter to the larvæ is a matter of the first sanitary importance. Nor is it one which as a rule would present any great difficulties either as to practicability or cost, as in a large number of cases the amount of labour required would be but small. To clear away the vegetation from our large *jhils* or marshes would be, I am perfectly aware, impracticable; but the proper way of dealing with these, if only for the sake of agriculture, is to drain them—a measure which has already been proved to be a great economic success in several parts of these provinces. As a matter of fact, however, sites safe from flooding during the rains are rarely to be found near a *jhil*, and for this reason villages of any considerable size are rarely found in their vicinity. On the other hand, ponds of considerable size originating in excavations for building material are almost universal in the immediate vicinity of all collections of houses, and to deal with these would be, as a rule, an easy matter. The only practical difficulty would be that it would be necessary to prohibit the cultivation of the *singhára* nut within a certain radius of inhabited sites, and as the water-nut is a subsidiary article of diet of some importance, there would be a certain amount of hardship in this to the one or two castes who are engaged in this form of cultivation, as they would have to shift their operations to *jhils* and other natural collections of water at a distance from their houses.

Be this as it may, there can be no doubt that there would be ample compensation for any hardship that might be caused, as these water-nut ponds as they stand are undoubtedly one of the most important sources of supply of mosquitoes in towns and villages. In cantonments, and even in the larger native towns, there should be no difficulty whatever in the matter, as in such places *singhára* cultivation is exceptional, and the forms of vegetation that shelter the larvæ are absolutely useless weeds, in whose preservation no one is interested.

Moradabad Dist., *Jan. 3rd*, 1904.

BRIEF CONSPECTUS OF THE TROPICAL DISEASES COMMON IN THE HIGHLANDS OF WEST CENTRAL AFRICA.

By Frederick Creighton Wellman, M.D.
District of Benguella, Angola.

Several years ago the writer noted that maps (accompanying scientific articles, &c.), designed to show the geographical distribution of disease, evinced no signs of having been based upon information from this part of the world. This fact, as well as the intrinsic interest attaching to details of disease conditions in any district not hitherto studied, has led to the preparation of this report.

In writing I shall not follow any scientific classification of the diseases mentioned, but shall, for the sake of convenience, use an arbitrary division based partly upon the diagnostic procedures commonly employed by the tropical practitioner. The method followed is simply to mention the various diseases treated in my dispensary since the beginning (1896), with their native names, when such can be obtained, and to make only such remarks as seem called for by their local peculiarities as to frequency, severity, symptoms, &c. The list will be found to consist almost entirely of tropical diseases in the usual acceptation of that term, and of only those which have been clearly recognised. Mention is made of only a few interesting cases of a doubtful nature.

(1) Diseases appearing from an Examination of the Blood.

Malaria (native name *ombambi*).—The only forms of the parasite yet seen are those of the malignant tertian type.[1] The only one of these at all common is the young ring form. I possess slides of these which show an almost incredible number of invaded corpuscles, some of which contain two and even three parasites. The conditions thus set up are myriad. Masked forms or the mimicking of other diseases are not uncommon. The typical malignant tertian fever is very frequent. Among the prodromal symptoms, pain in the shins, yawning and headache, are those of which complaint is most frequently made. Rigor is generally very slight, often absent. A sense of suffocation is very common. Epistaxis and vomiting are occasionally seen. Temperature runs high. The spleen is almost always inflamed, or at least congested, even in comparatively mild attacks. I have very seldom demonstrated albuminuria. In children the convulsive and comatose forms are occasionally seen. The latter of these is often fatal in infants. Cachexia is not rare. The pernicious anæmia set up by neglected invasions of malaria are often easily detected by the physical signs. Exami-

[1] It is very possible that benign tertian and quartan have escaped my notice. However, it is only fair to state that I have examined the blood of many malarial patients in this district, and that the appearance of the above parasites are familiar to me.

ation of the blood shows variation in size of red corpuscles and occasionally polychromatic red corpuscles. A large number of the apparently healthy natives have a high percentage of large mononuclear white corpuscles. In acute malarial invasions I have noticed excess of myelocytes. The splenitis, if allowed to become chronic, sometimes results in enormous permanent enlargement. I once examined a young Portuguese lieutenant whose spleen reached practically to the crest of the left ilium and well to the right of the umbilicus. The common anopheles are *A. costalis* and *A. funestus*. It is an interesting fact that in the town where the writer is stationed the number of fevers has greatly increased since the cutting of an irrigating ditch through the town a few years ago.

Filariasis is rare. In the course of routine blood examinations of cases of suspected malaria, one occasionally sees films containing a sheathless filaria somewhat longer and sharper tailed than *F. perstans*, and which is probably allied to *F. Demarquaii*. I have not yet demonstrated *F. nocturna*, although I have now a case of varicose groin glands under my care, and what appears to be *Elephantiasis arabum* (native name *visonya*) is not uncommon. I have encountered also a solitary specimen of a large filaria unknown to me.

A Hitherto Undescribed Filaria.

I found this filaria late one evening in one of about fifty blood films from as many different natives, my object being to secure *F. nocturna*. The embryo presents some points of difference from any of the filariæ described in Manson, Scheube, or my files of the Journal of Tropical Medicine. My first thought on catching sight of it under low power was that it might prove to be the *F. "gigas,"* described by Mr. Prout in the Journal of Tropical Medicine, for Oct. 15th, 1902; but a few minutes' observation, with the plate accompanying Mr. Prout's article before me, negatived such a supposition. Scheube ("Diseases of Warm Countries," p. 454, note) speaks of the occasional presence of *Anguillula stercoralis* in the blood; but on comparing stained preparations of *A. stercoralis* with the doubtful specimen, it was plain that they are not the same. The new filaria stains slowly with methylene blue, but most beautifully and delicately, the somewhat elaborate structure showing plainly. The stained specimen exhibits very faint granules, which are possibly a *post mortem* phenomenon. It tapers at both cephalic and caudal extremities, most markedly at the latter. Both head and tail are blunt. A line which appears to represent a central viscus extends from the head to a point near the tail. But what is most striking is an apparent groove, which extends along what may be termed the ventral surface of the worm. This could well be described as resembling, on a small scale, the gynæcophoric canal of the male *B. hæmatobia*. Just what the embryo may be is not clear to me, and in case I succeed in securing additional specimens I shall publish a note with measurements and plates, in the hope of hearing, through these columns, from some one qualified to pronounce upon such a question. Since writing this note I have called up again the woman from whom I secured the specimen and examined her blood carefully. I found no more filariæ.

Leucocytic variation.—This symptom may be appropriately mentioned here. Excess of large mononuclears has been spoken of under malaria. Eosinophilia seems to be sometimes present and sometimes capriciously absent during invasions of *Oxyuris vermicularis* and other intestinal parasites.

Trypanosomiasis.—I have very lately made a persevering effort to find trypanosomes in the blood, with no result.

(2) Diseases appearing from an Examination of the Fæces.

Dysentery (native name *pulukala*, from Portuguese verb *purgar*).—Porters going from here to the coast for loads often acquire this disease, which is endemic in the lower altitudes, and large numbers of them die from it. *Amœba coli* can sometimes be demonstrated in fæces or mucus (as well as occasionally in the fæces of apparently healthy natives).

Ankylostomiasis (native name *apuka*).—Fairly common. Comparatively few ova can be demonstrated in the fæces. Under a $\frac{2}{3}$ object glass with No. 2 eye-piece, one, or at most two, ova only will be seen on the field. The worms passed after thymol are also few. Nevertheless the symptoms are sometimes very severe.

Ascaris lumbricoides native name *olonyoha*).—Almost universal amongst children, and adults frequently affected. I have seen ninety-six worms passed by a child 2 years old, the result of a single dose of santonin and castor oil.

A New Ascaris?

I have a specimen of round worm, a female, passed by a white child, which is peculiar in having a deep constriction at a point about two-fifths of the distance from the head to the tail, and corresponding to the sexual opening. In general appearance the worm otherwise resembles *A. lumbricoides*; but the ova seen both in the fæces and taken from the parent worm are, although about the same size, distinctly different from the ova of *A. lumbricoides*, or *A. mystax*. They are bean-shaped, and in the mature form, as found in the fæces, neither yolk nor shell can be made out. The crenated and rugose albuminous envelope is opaque and stained with bile, and might easily be mistaken for a small mass of fæcal matter. Ova taken from the uterus at various stages of development show a simple shell filled with a granular yolk. Whether this worm, which was seen with me by Rev. W. E. Fay, represents a new species or not I cannot say.

Tænia (native name *apapi*).—There are several kinds. The most common is a fish tape worm gotten by eating half-cooked fish at the coast and in the interior where fish abound. There may also be occasionally found in fæces what at first sight appears, more especially to the naked eye, to be portions of a minute tape-worm, having vacuoles in the segments which might be mistaken for ova. But when more complete specimens are obtained, one is in doubt whether to pronounce it a cestode, or one of the Cryptogamiæ. Small fragments seen alone would at once be pronounced proglottides but examination of larger pieces reveals the fact that these somites occur around a central structure composed of a bundle of spiral ducts. It will be seen that this arrangement is partly analogous to that of a *chara*. In the gelatinous substance between the central structure (which reminds one of a plant's circulatory system as it occurs, for instance, in the stalk of a strawberry leaflet) and the cortex of segments, are what are either spores or ova. They give every appearance of being the latter, and when undisturbed lie in transparent tubes which are possibly uteri. One specimen mounted in glycerine shows at one end a neck and head (possibly a thallophytic root); this latter is provided with what appears to be a mouth or sucker. Cases with fragments of this puzzling parasite in the fæces suffer from digestive disturbances and asthenia. In the one case under my care which terminated fatally, and in which the

parasite was very plentiful, I was unable to secure a *post-mortem* examination.

Oxyuris vermicularis is found.

Trichocephalus dispar.—Notwithstanding the large number of fæces' slides which have passed under my eye, I have seen but one solitary ovum, which was lately brought to my notice by Dr. A. Yale Massey.

Chronic Diarrhœa (native name same as for dysentery).—Not infrequent. Very intractable to treatment. I have sometimes seen it associated with the presence of enormous numbers of what I took to be *Anguillulæ stercorales* in the stools.[2]

Sprue I have not seen.

(3) Diseases appearing from an Examination of the Urine.

Hæmoglobinuric Fever.—Common among Portuguese officers, traders, &c., coming from the unhealthy littoral to the cooler highlands. Called by them biliosa. The third attack is quite often fatal. I have never seen it in a native.

Endemic Hæmaturia (native name *ongandu*).—More common in some districts than in others. Ova of *B. hæmatobia* plentiful in urine. Rectal lesions giving ova in fæces with side spine are occasionally met with as well.

(4) Diseases appearing from an Examination of the Sputum.

These are almost *nil.* I have seen cases among the natives closely simulating *Tuberculosis pulmonalis*, but a microscopical examination of the sputum always negatived the diagnosis. I have not yet found any sort of distomum in sputum. There is, however, a distinct and peculiar affection of the chest very common throughout the whole country. The native name is *vonulo.* It appears to be a nervous affection of the bronchi and bronchioli. It is like asthma in that it seems to be due to a neurosis which depends upon the existence of a peculiar diathesis. In its clinical features it is radically different. The principal and constant symptom is great pain in the chest. There is neither expectoration nor dyspnœa. Some of the cases called *vonulo* have proved to be ankylostomiasis, but still there is no doubt but that a typical case is a separate disease as definite in its clinical picture as is asthma. Some work with cultures has thrown no light on the etiology of the disease. The natives attribute it to the carrying of heavy loads; but this would seem doubtful in numberless cases, *e.g.*, women, chiefs, cripples and others, who never carry loads.

(5) Diseases appearing from an Examination of the Skin.

Leprosy (native name *ovihata*).—Is becoming distinctly more common in this immediate vicinity during the last five or six years. In one group of villages, where there was one leper five years ago, there are five to-day, and a similar condition obtains in other groups. No attempt at segregation is made either by the natives or the Portuguese authorities. Nerve leprosy is the more common form, which would appear rather anomalous in a country where leprosy is comparatively new.

Yaws (native name *shumbula*).—Fairly common, although I doubt if it is endemic. The natives generally acquire it in the Luba country, where they go slave-trading. Attributed by them to sexual promiscuity with the Luba women. Cases generally are typical. I know of one white man who contracted it.

Craw-craw (native name *olohala*).—Scabies, from the mildest to almost incredibly severe and neglected cases, sometimes present any and all the symptoms enumerated in descriptions of this disease. I have not found filariæ in the papules. The itch parasite can almost always be found.

Prickly Heat.—Seen only among Europeans.

Uyamba (this is the native name), possibly Pinta.—Much less pronounced in its pigment changes than the usual type of pinta.

Ukau (native name).—A skin disease resembling eczema.

Ovilundu (native name).—An epiphytic disease somewhat resembling *Lupus vulgaris* in its macroscopical appearance. The names of the three last diseases are the same as three kinds of edible mushrooms, and the native notion is that the diseases are caused by eating and handling the several mushrooms.

(6) Diseases detected by a General Examination of the Body.

Beri-beri.—Rare. I have seen but two cases in seven years.

Sleeping Sickness.—Very rare. Have examined three cases, all of which came from the Lunda district to the north of here, beyond the Coanza River. I at one time spent several months at Malange, Lunda District, where I saw many cases, the disease being very common there. I have never known of a well-authenticated case originating here.

Low Fever (native name *ocipuiyi*).—Common both among whites and natives. Thought by the latter to be caused by fatigue. Oftenest seen in new arrivals.

Heat Stroke.—Rare. I have met with two cases, both of simple heat exhaustion. The first of these was an American missionary about 60 years of age, the other was my own experience; I suffered a stroke in 1902. The case exhibited almost exactly the symptoms detailed by Manson. Since then I have adopted the suggestion of a red covering for head and spinal region, when compelled to be long in the sun, which affords great relief. While my symptoms were those of heat exhaustion rather than those of sun traumatism, yet I find since that, unless so protected, I feel the sun's rays more than formerly.

Akatama (a native name).—This is an endemic neuritis which I have already described in another place.[3] It is distinct from beri-beri, from the peripheral neuritis sometimes following dysentery, and, so far as I know, from other described tropical diseases, including the different tropical neuroses. The main symptoms are, to quote from a former article, "shooting, prickling, 'crawling' pains in the affected part, accompanied by numbness." Swelling, erythema and excessive sweating of the part also occur.

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[2] This worm, which I first saw in 1899, does not entirely correspond to descriptions of *A. stercoralis.*

[3] Journal of Tropical Medicine for September 1st, 1903.

Manioc Poisoning.—There are two kinds of manioc grown by the natives, called by them "sweet" and "bitter." These are sometimes confused, especially by children, and consequent poisoning results. This occurs only when the root is eaten in its raw state.

Poisoning by Witch Doctors (native name *owanga*).—This frequently takes place. The substance often used is a parasitic plant resembling the common mistletoe. The natives are sometimes frightened to death by these witch doctors. The *modus operandi* is to curse the devoted one, prophesying his early death, &c. The victim generally gives up hope and dies on the very day named. Of course poison is often secretly administered along with the curses, but some cases are, beyond a reasonable doubt, mere fright.

(7) LOCAL AFFECTIONS.

Hæmorrhagic Bulla (native name *onyalai*).—A common and very treacherous disease, greatly feared by the natives. Considered by them very fatal. I was once disposed to treat the native view very lightly, but after seeing cases die from it in a few hours from the beginning of an attack, I revised my notion. The bullæ may be small and affect only the surface of the body, or occur only on the tongue, soft palate or buccal mucous membrane. When large and involving the œsophagus and pharynx they may cause trouble, but when you get them in the brain, its membranes, or even in the important abdominal viscera, death often results. The size of the bullæ varies markedly, ranging from that of a split pea to that of a half-crown piece.

Marginal Ulceration of the Gums.—Sometimes spoken of by the laity as "land scurvy" (native name *ocimumusu*).—Quite often seen. Causes loss of teeth if not treated.

Climatic Buboes (native name *owambe*).—There are, of course, enlarged glands from various causes which are not climatic buboes: but these latter do occur and that not infrequently.

Keloids (native name *ocimbusi*).—Keloidal fibromata of ears, &c., not uncommon. The native seems to have a tendency to keloidal formation. Scars from burns, tatoo marks, &c., often take on this character.

Goitre (native name *esasa*).—Remarkably common, especially among women. Rarely they reach an enormous size, twice or even three times as large as the person's head.

Tropical Phagedæna.—Not so common as in lower altitudes. Generally attributed by the natives to some small injury.

Ainhum (native name *ombanja*).—Occasionally causes pain and inconvenience enough to bring patients for surgical interference.

Jigger (native name *ewundu*).—The *Pulex penetrans* is ever with us. It was introduced into this country (by the Portuguese from South America) about thirty-five years ago. Since then it has nearly traversed the continent and is steadily pursuing its way around the world. It is a universal pest here. Shocking deformities, gangrene and blood-poisoning may be mentioned as some of the evils for which the jigger is responsible.

Snake Bites.—The worst and commonest of poisonous snakes is the *ombuta*, a puff adder. Its bite is fatal unless treated. Prompt excision or cauterisation, injections of permanganate of potash locally, with whisky internally, have saved cases.

Other Bites.—All vermin are common. The bites of different ticks are painful. I may speak here of the *ocihopio* (*Ornithodorus moubata*). This acarus is never lacking in old native huts. Its bite is very painful, as I can personally testify, the swelling and irritation (in the case of whites) not subsiding for days. However, I have not seen "tick fever," probably because my attention has only lately been directed to the subject.

Leeches (native name *etuli*).—I have heard of exhaustion from loss of blood by these, when travellers are forced to traverse large swamps and plains covered with water.

Eye Troubles.—Cataract (native name *olohopio*) not uncommon. Ulcer of cornea (*onende*) sometimes seen. Pterygium occasionally. Quinine amblopia seen several times. There is much blindness as a result of small-pox. Contagious "sore eyes" comes around every two or three years.

APPENDIX.

(1) *Epidemics.*

Small-pox (native name *ocingongo*).—There have been two epidemics of this scourge during the past seven years. Thousands of natives were carried off by it. I vaccinated one community of about 250 natives and in which not a case occurred.

Chicken-pox (native name *osalambu*, from Portuguese *sarampo*, measles, the natives having mixed the names).—Two epidemics in seven years, nearly synchronous with the small-pox epidemics just mentioned. The natives believe small-pox is always preceded and caused by chicken-pox.

Mumps (native name *okapukulu*).—One epidemic in seven years.

Influenza.—One epidemic.

(2) *Other Diseases Common to all Climates which are frequent in this District.*

Epilepsy (native name *ocinonya*).—Very common. Considered by the natives a contagious disease.

Pneumonia.—Not rare and not seldom fatal.

Chronic Bronchitis.—Very common in the aged.

Gonorrhœa and Syphilis.—Have been introduced from the coast by whites and civilised blacks. They are on the increase.

(3) *Surgical Affections.*

Applications for relief come oftenest from patients suffering from cataract, inguinal hernia (which is amazingly common), deformities generally the result of accidents, tumours, bone necroses, abscesses, lacerations of the cervix uteri (the result of too early child-bearing) and gun-shot and other wounds. A vast number of surgical cases never apply to the European practitioner, preferring native treatment.

In conclusion I may again say that the foregoing outline does not pretend to be exhaustive. The most claimed is that the data given have, almost without exception, come under the personal observation of the writer. To those who have practised in the Tropics

it is not necessary to detail the varied hindrances to observation and study that have prevented my making this report more complete. I trust, however, that the above *précis* of the more obvious disease conditions in a little known district may be of some interest, and possibly serve as a nucleus to which may be added the results of further work.

KERATITIS.

By Wm. Robertson, M.D.

Durban, Natal.

On October 15th, 1903, I drew attention in a short note in the Journal of Tropical Medicine to a severe case of bilateral gummata round the knee-joints in an Indian. The obscure nature of the condition and its resemblance to tuberculosis were indicated. The other points were the rapid disappearance of the gummata under mercury and the susceptibility of the Indian to the drug. Gummata in such a region and so superficial, may be considered rare and connected perhaps with some increased susceptibility of the Indian to syphilis.

Another such case illustrating the same aspects, with rarity of condition, bilateral development, &c., in an Indian, lately came under my care, and may be deemed worthy of passing notice.

Nosoreb Khan, aged 30, a fireman, seen on December 2nd, 1903, with deep injection of left eye, circumorbital pain and two small creamy looking spots in lower part of cornea. The pupil seemed to be fixed and there was a significant swelling of the eyelids of same eye. Right eye normal. On examination every glandular area was found to be the seat of adeno-syphilis, and recent scars of chancres were found on the penis. Syphilitic iridocyclitis was the provisional diagnosis arrived at. Considering that the patient probably never had had any anti-syphilitic treatment, mercurial inunction (ung. 1·2) was at once commenced with pot. iodid. gr. 15, t.d.s., until the mercury was properly under weigh. For the rest, liq. atropin. was instilled and boracic acid used for a lotion to the eye.

Next morning, on examining the eye, a thick white membrane was observable over lower part of left cornea, about the size of a grain of wheat, with general cloudiness of cornea, and the right cornea was found infected in the form of a large blistered surface occupying the centre of the cornea like a clear abrasion without infiltration. The gums were beginning to get soft. A 2 per cent. solution argent. nitras was applied to both corneæ, and the mercurial ointment was now rubbed into both temples and round the eyes morning and evening. Improved diet with a little wine was given. Next morning, the third of observation and inunction, a better state of matters existed; the membrane on left cornea had disappeared, leaving a small infiltrated area of cornea, and the abraded surface on right cornea had become cloudy. Less pain in the left eye was now present.

Three or four days after the gums had become affected the iodide was stopped, and calomel dusting of the corneæ was adopted with good effect. A salmon-coloured patch of infection was observed at left lower corneal border.

On the ninth day of inunction both corneæ clearer, left eye angry looking.

December 12th, right eye perfectly clear; left cornea at lower margin still cloudy.

December 15th, left cornea clear, but uneven at lower part; iris clearly seen; pupil normal. Right eye well.

Herewith I append a sort of time-table of the action of mercury for this case.

Time Table of Hg. Keratitis.

December 2, 1903. (1) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Kl. gr. 15 t.d.s.

December 3, 1903. (2) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Kl. gr. 15 t.d.s., and the right eye improved.

December 4, 1903. (3) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Kl. gr. 15 t.d.s.; left eye better.

December 5, 1903. (4) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Kl. stopped, gums affected.

December 6, 1903. (5) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Calomel dusting; both eyes better.

December 7, 1903. (6) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Calomel dusting; both eyes better.

December 8, 1903. (7) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Calomel dusting; both eyes better.

December 9, 1903. (8) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Calomel dusting; right cornea clear.

December 10. 1903. (9) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Calomel dusting; left cornea clearing

December 11, 1903. (10) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Calomel dusting; left cornea clearing.

December 12, 1903. (11) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Calomel dusting; left much better.

December 14, 1903. (13) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Calomel dusting; trace of muddiness in left cornea.

December 16, 1903. (15) Ungt. Hg. (1·2) inunction ʒiss. daily round eyes. Both corneæ well.

Remarks.—Several points of great clinical interest hang round this case. The occurrence of the condition itself would appear to be a rare thing in acquired syphilis and in an adult. As a congenital manifestation of syphilis and in youth, it is more commonly met with where the infiltration is deeper and more intractable to treatment. Its occurrence in this case may be attributable to the greater gravity of syphilis in the Indian, and to his being less immune.

Again, any data sufficing to give a true indication of the time mercury requires to reduce a lesion, and at the same time register the date after which no further gain can be expected from its use are worthy of note. As Sir W. Gowers has pointed out, this is a desideratum in syphilis of the nervous system.

For one of these requirements, the table I have furnished may afford some small approximate indication, tissue for tissue being taken into account.

It has been stated that the dark races are more immune from syphilis than Europeans. In my experience the contrary is the case, both as regards Negroes and Indians.

The dangerous susceptibility of Indians to mercury is to be noted, a feature due perhaps to their possession of a much more highly functionating skin than the European.

The use of mercury as near the affected region as possible is of great service in the case of the eye. The patch of membrane observed on the left eye at the commencement may probably have been due to some secondary infection.

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BERI-BERI AT NOUMEA, NEW CALEDONIA WATERCRESS A CURE.

BY a communication dated Foreign Office, February 12th, 1904, and forwarded by the courtesy of the Secretary of State for Foreign affairs, we are privileged to publish a fact respecting beri-beri. The British Consul at Noumea, in a letter dated December 19th, 1903, states that beri-beri is very prevalent amongst the natives of all nationalities working at the mines in New Caledonia. He further adds that "watercress" is an almost certain cure, and that all the mining companies are cultivating watercress largely.

Sir Patrick Manson, medical adviser to the Foreign Office, commenting on the information states that "similar announcements as regards the influence of various kinds of food in beri-beri have frequently been brought forward on inadequate experiences." He also adds, "It would seem that in the endemic area many kinds of malnutrition predispose to the disease. It may be that there has been a deficiency of vegetables in the dietary at the mines in New Caledonia predisposing to beri-beri, and that this deficiency has been made good by watercress. That this vegetable has a specific action in the germ of the disease I question."

The scorbutic nature of beri-beri has been entertained by many during the past few years, and the most recent addition to our knowledge, that watercress is a cure of the disease, appears to favour that view.

THE
Journal of Tropical Medicine
FEBRUARY 15, 1904.

THE STYLE OF ARTICLE WE WISH TO ENCOURAGE.

THE article by Dr. Wellman in the current issue of the Journal is of a form and character we want many more of. We have had but few of the kind, although requests have been made in our columns from time to time. Dr. Wellman gives a conspectus, in other words, a synopsis and comprehensive survey of the tropical diseases met with in the district he practises in, namely, the Highlands of West Central Africa. Not since Dr. Campbell Highet, of Bangkok, Siam, published his "Ophthalmic Notes from the Tropics" in this Journal on March 1st, 1901, have we had a contribution given with that comprehensiveness which is so desirable a feature in contributions from distant lands. It is a form of communication which every practitioner can imitate, and by doing so add to our real knowledge of the geographical distribution of disease.

In addition to the publication of accounts of rare cases, of pathological curiosities, or occasional epidemics, important as they often are, what is wanted is a list of the diseases endemic to, or usually met with in, particular regions, districts, cities and localities in the Tropics.

In this important work all can share. It is easy for any practitioner, however busy, to state on paper what are the ailments he usually encounters in his daily routine. It seems, no doubt, commonplace enough to record the fact that in the ordinary course of practice so many cases of malaria were treated, that a certain number of children were operated upon for adenoids, that some dozens or scores of persons had to be treated for round worms, that measles were prevalent and so forth; but a succinct account of the ailments of every-day life is just what is wanted by epidemiologists, and by every one interested in the distribution of diseases in the world. No doubt many of our readers remember a circular they received some few years ago, from

a well-known investigator in London, requesting information concerning the prevalence of adenoids among the peoples they came in contact with. Others have also desired information concerning so seemingly small a matter as the perfection or decay of teeth. The presence of any ailment, or the absence of any ailment, in particular regions of the earth, however remote, is of interest; and not merely from an academic point of view, but because of the direct bearing such information affords towards bettering our knowledge of the natural history of disease. When malaria is declared to be unknown in, say, some little-known island, the negative information is of immense practical importance. If absent, why is it absent? Is it because of the fauna, the geological formation, the climate, the precautions taken by the natives, the absence of the possibilities of infection, or is the immunity due to some other cause, be it from terrestrial, or celestial influence? It is the place at which scientific enquiries may bear fruit as regards the prophylaxis of the disease.

We would, therefore, urge practitioners in tropical countries to contribute their quota of information; information which conveys real knowledge, which requires no technical education, no close scientific investigation in a laboratory for which there is neither time nor opportunity. They are by such communications adding facts to medical knowledge and information of a kind which cannot be upset by subsequent observers. The knowledge that during a particular season or year certain diseases were, or were not, found in a particular locality is of immense importance, especially in view of later writers reporting from the same district; for thereby a comparison may be instituted, and the advent or disappearance of diseases from the region in question noted.

The appearance of sleeping sickness in Uganda, the advance of scarlet fever in parts of the world where it was previously unknown, are cases in point; and as human intercourse develops so will diseases spread, and the medical records of any part of the world at a definite period must for ever remain as a piece of history. We hope, therefore, to be the medium of focussing and distributing the information accruing to so fertile a source of knowledge; and surely amongst the 6,000 medical men holding British diplomas, who are practising abroad, a considerable number will be found sufficiently interested in their profession to help forward a branch of science possessing an all-important bearing.

THE TREATMENT OF PERSONS SUFFERING FROM TROPICAL AILMENTS WHILST ON LEAVE.

Regulations proposed by the Colonial Office.

It frequently happens that persons returning from a tropical country to spend some months in Britain are seized by illness caused by disease contracted in the Tropics. The nature of the complaint may be perfectly familiar to the patient, but its diagnosis and treatment may be a matter of doubt and perplexity to the medical practitioner under whose care the patient comes. The patient under such circumstances may, and often does, proceed to treat himself or herself, and the old saying, in regard to those who do so, is likely to receive confirmation of its truth.

To such an extent have these conditions obtained that we understand the Colonial Office authorities are about to issue instructions dealing with the matter so far at least as the West African colonies are concerned.

These rules and regulations are entirely in the patient's interest, and every thoughtful man will welcome their issue.

To ensure that the health of the officials, from the West African Coast at home on leave, shall be properly attended to the Colonial authorities are, we understand, to draw up rules and regulations on the following basis:—

(1) An officer on duty in the West African Colonies applying for leave shall forward a certificate from his medical officer as to the state of his health. If the applicant be not in good health the certificate given by the medical officer shall be accompanied by the notes of the case and a recommendation as to the course to be followed by the invalid when he arrives in Britain. The papers are to be forwarded to the Governor when leave is applied for, and subsequently sent to the Secretary of State of the department with a notification of the length of leave granted.

(2) On arrival in Britain the invalid is to follow the advice tendered by the local medical officer on the coast, and is required to report himself to the Medical Department of the Colonial Office, if advised to do so.

(3) In the event of an officer, who leaves the African coast in good health, falling ill after leaving the coast or on reaching home, and remaining ill for a week, the fact must be reported to the Colonial Office; and, so long as the officer remains ill, a fortnightly report of the state of his health must be sent by the medical practitioner under whose care he happens to be.

(4) Should these conditions be neglected, and should any extension of leave be asked for, in case of illness

the officer will not be entitled to pay during the period of such extension.

We are of opinion that these rules and regulations are just and equitable, and are calculated to serve for the good of the invalids themselves and for the efficiency of the Service. We rejoice to see any measures taken by the Colonial Medical Department towards placing the organisation and discipline on the same footing as the other great public services of the empire, and we consider the regulations proposed a step in that direction.

We are aware that difficulties similar to those affecting the Colonial Service are in evidence amongst the employés of the mercantile services, and were corresponding regulations in regard to illness enforced by the British Companies having interests in West Africa, and perhaps elsewhere, a great many of the vexed questions of pay during extension of leave and re-employment after illness would be overcome.

British Medical Association.

LIVER ABSCESS, WITH TEN CASES.

By James Cantlie, M.B., F.R.C.S.,
Lecturer on Surgery, London School of Tropical Medicine.

(*Continued from p.* 46.)

Case 4. *Intrahepatic Abscess: Recovery.*—R. B., aged 26, European, male. The patient went to Ceylon in March, 1897; he had malaria six months after landing. Had dysentery May, 1898. In June, 1900, had dysentery again and recurrences at intervals during 1900. In February, 1901, whilst in Ceylon, had pains in right shoulder and in the epigastrium. Admitted into the Seamen's Hospital August 25th, 1901, looking anæmic, with icteroid tinted complexion. Temperature 99·8°. Liver dulness increased upwards in mid-axillary line. On August 28th pus was found 4 in. from the surface (the patient's chest measured 40 in. in circumference). The abscess was treated in the usual way by trocar and cannula and drained by siphon drainage. In this case the cavity was washed out from September 9th with normal salt solution and a weak solution of tincture of iodine. Previous to operation the temperature ranged between 97° F. in the early morning and 100·6° F. in the evening, until the abscess was opened, when it reached and remained at the normal. The patient left the hospital completely recovered on October 15th, 1901.

Case 5. *Intrahepatic Abscess: Recovery.*—T. W., European, male, aged 40. Went to China in 1899. In October, 1900, had dysentery; recovered, and came to England, March 12th, 1901, quite well. During the first week of April, 1901, got pain in right shoulder and night sweats, and began to rapidly lose weight, so much so that in three weeks he lost 3 stone. Admitted to Seamen's Hospital April 25th, 1901. The patient was then pale and sallow, and had marked pain, especially on movement, in the right side and in the right shoulder. Liver dulness increased upwards along the whole of the hepatic dome; downward increase not marked; there was slight cough and expectoration of brownish mucus. During the five days he was in hospital before operation the morning temperature was subnormal, and the evening temperature rose to 102° F. usually. On May 1st, 1901, abscess operated upon by trocar and cannula and siphon drainage; 20 oz. of liver pus drawn off at the time of operation; in the pus neither amœbæ or cocci. During the progress of this case there was some difficulty with drainage owing to the liver subsiding downwards, as the size of the abscess and the congestion of the liver diminished. When the drainage was unsatisfactory the base of the right lung became congested, the temperature rose slightly, and it was found necessary to open up the wound more widely on June 3rd. After this the expectoration became muco-purulent and at times tinged with blood, the right lung at its lower lobe becoming consolidated. An abscess was opened on left forearm on June 27th. On July 19th, 1901, the patient left the hospital quite well.

In this case the pus seems to have found its way towards the base of the left lung without having actually opened into a bronchus, hence the long-continued pulmonary congestion and the delay in recovery.

Case 6. *Intrahepatic Abscess: Opened into Lung: Operation: Recovery.*—J. A. M., European, male, aged 41. In China sixteen years. Had dysentery 1894. On August 8th, 1902, I saw patient for first time and diagnosed an abscess in the liver; he was incredulous, and wished operation deferred. He continued during August to go about, although feeling very ill and in considerable pain in right hypochondrium, with severe night sweats. Whilst in Brighton, where he resides, the abscess, on August 30th, 1902, burst upwards through a bronchus, and the patient expectorated a large quantity of liver pus. The temperature fell somewhat for a few days, but rose again on September 8th; he continued to expectorate from 1½ pint to 2 pints of pus daily until October 7th, when the expectoration ceased. Great pain and distress ensued, but relief came on the following day by 1½ pint being suddenly coughed up. On the evening of October 8th, owing to the incessant coughing and distress, Mr. V. T. Greenyer was called in. An incision was made in the post-axillary line, a piece of rib was removed, and a drainage tube inserted into the abscess. I saw the patient on October 18th at Brighton, he was expectorating liver pus in quantity; temperatures in the evenings rose to between 102° and 103°; the patient was in great distress from incessant cough and sleeplessness. I punctured the liver more deeply by trocar and cannula, and drained by siphonage. Pus flowed freely from the drainage tube, probably from another abscess, the cough ceased, the temperature fell immediately, and the patient completely recovered in a few weeks.

Case 7. *Intrahepatic Abscess: Operation: Recovery: two Subsequent Attacks of Hepatitis (Non-suppurative).* T. S., aged 37, European, male. The patient had malaria in Cyprus, 1898, and at Assiout, subsequently, had several attacks of fever. Admitted to hospital at Cairo, July 26th, 1901, with dysentery and a temperature fluctuating between 98° F. and 102° daily, with loss of weight, enlarged spleen and liver, and night

sweats. August 20th he complained of sharp pain in the right mid-axillary line over the ninth rib. Subsequently the intestinal flux abated, the spleen and liver diminished in size, the pain abated, the temperature fell to nearly normal, and the patient left Egypt for England. September 17th, 1901, I saw the patient and so masked were the symptoms that it was not until October 15th that I advised exploration of the liver. On October 18th, 1901, a quantity of pus was found deep in the substance of the liver—an intrahepatic abscess. The abscess was treated in the usual way by trocar and cannula and siphon drainage. The temperature immediately fell to normal, and in twenty-one days the patient left the hospital completely recovered. On November 25th, 1901, the patient returned with increase of temperature and signs of hepatitis, the assignable cause being insufficiency of clothing, the patient wearing no overcoat, and thin underclothing during the month of November in England. The liver was swollen, the lower lobe of right lung congested. Right pleuritic and peritoneal friction could be heard for several days over the chest and around the seat of the old operation. Suspecting pus had formed, the patient was put under an anæsthetic, and the needle of an aspirating syringe inserted in ten separate places, and passed in all directions in the liver. As an example of the extent the liver may be traversed by a needle, I may mention that although the skin was punctured in but ten places, the needle without being drawn was in most instances made to traverse again the liver substance at another angle, so that twenty-two separate punctures were actually made in this case at one sitting. A considerable quantity of blood was drawn off in the syringe, amounting in all to 9 or 10 oz., the blood being allowed to follow freely into the syringe when a large blood vessel happened to be tapped. This plan I invariably follow when searching for pus in the liver, and always with immediate and marked benefit to the patient. No pus was found, and the temperature began slowly to fall, the pain to subside, and by December 14th the temperature was normal. The patient had evidently an attack of hepatitis, and the assumption that the attack was due to chill and not another abscess, would seem substantiated. In January, 1902, the patient had again reached Assiout on the Nile, apparently in good health. In March, 1902, however, he had again a sharp attack of heptatitis lasting some four weeks. From this, however, he again recovered without an hepatic abscess forming.

Case 8. *Two Abscesses, one not Drained: Death.*—T. H., aged 65, European, male. Had dysentery March, 1902, in Natal; never in good health since. Admitted August 5th, 1902. Liver explored and pus found. Abscess treated by trocar and cannula and siphon drainage. A little pus (3 oz.) escaped at the time of the operation, and but very little through the tube afterwards. As the patient was not doing well, on September 19th the abscess cavity was freely opened up and a double drainage tube introduced. The patient, however, got pulmonary congestion of both bases, and died October 16th. *Post mortem*, an intrahepatic abscess was found in the substance of the right lobe untouched by the trocar and cannula.

In this case the circumference of the man's chest at the region of the liver was 41 in., and the length of the needle used—3¾ in.—was evidently too short. This case also serves to teach an important clinical point, namely, when pus is found in the liver and the abscess efficiently drained, and yet the febrile symptoms do not subside, suspect another abscess and search the liver until it is found. The anatomical data given at the introduction to this article should be borne in mind: That the depth of puncture should vary with the size of the chest at the level of the liver.

Case 9. *Intrahepatic Abscess: Pyæmic Organism in Blood at the Time of Operation: Died: Many Small Abscesses found in Liver Post Mortem.*—E. S. M., aged 59, European, male. In China the patient had malaria and dysentery occasionally during twenty-eight years' residence. Developed fever in London during April, 1902. No malarial parasites in blood, and the cause of the fever was not diagnosed. In June had recurrence of fever, and was treated for malaria for two months in London, but without any beneficial results. The patient got weak and emaciated to an extreme degree. September 17th, 1902, I saw the patient at Brighton with Mr. E. Treves, under whose care the patient had just come. Mr. Treves had diagnosed a liver abscess. The abscess was treated by trocar and cannula and siphon drainage. From one to two pints of pus escaped at the time of the ope ation, and for three days it flowed away by the tube. The abscess was evidently of considerable standing by the appearance of the pus, being thick, greenish and smelling badly. *Post mortem*, the liver was found adherent all round, and, whilst the main abscess was drained, numerous multiple abscesses were scattered throughout the liver substance.

As in Case 1 there is no doubt that the abscess in this case had become more or less encysted, and the fact that after three days the pus suddenly ceased to flow and a sero-sanguineous fluid (not bile-stained) came away instead, confirmed that opinion.

Case 10. *Intrahepatic Abscess: Operated on in Japan: Recurrence: Pyæmic Organisms in Blood at Time of Second Operation: Died of Hæmorrhage from Abscess Cavity.*—E. R., aged 28, European, male. In China got fever in March, 1902; went to Japan. A liver abscess pointed in epigastrium, where it was opened and drained. The wound healed over, and he came to England *via* America. Went to watering place in the North of England, where he was treated for malaria. He was seen at Coventry by Dr. M. M. Moore, who diagnosed hepatic abscess. On October 20th I operated in the usual way—trocar and cannula and siphon drainage. The pus flowed from cannula with enormous force, and from one to two pints escaped at the time of operation. Drainage not quite satisfactory. On October 27th and again on November 11th, the channel was enlarged until three fingers could be introduced into the wound. The patient never did well. Staphylococci were found in the blood, but no malarial parasites. The patient died suddenly of hæmorrhage from the walls of the abscess cavity.

Most probably the hæmorrhage was due to pyæmia, although there was some evidence in the history of the

case that it might have resulted from cirrhosis. This case proves the futility of opening a liver abscess in front. If a hepatic abscess is pointing in the epigastrium it is of great extent, and can be, and ought to be, reached from the neighbourhood of the angles of the ribs. Should the abscess have been opened in the epigastrium it should also, as soon as possible, be drained from further back and the front wound allowed to close.

THE ELUCIDATION OF SLEEPING SICKNESS.[1]

By Dr. Louis Sambon.

Sleeping sickness has been known to Europeans for over a century, but until quite recently we had no definite knowledge of its etiology. It was believed to be strictly confined to the negro race, and was looked upon as a peculiar form of nostalgia. At times, it caused considerable losses to the slave-traders of the West Coast, notwithstanding the careful isolation of the sick and the weeding-out of all such as presented glandular swellings about the neck. When any of the slaves showed symptoms of the disease on transport ships they were mercilessly thrown overboard; some developed the malady long after transportation, and died of it in the plantations of the Antilles. But the disease never spread in the places to which it was imported, and therefore it did not give rise to any serious apprehension.

Within the last few years, possibly in consequence of the great commercial stir which the advent of the white man has created amongst the native tribes of Tropical Africa, sleeping sickness has begun to spread very widely, and has assumed a fearful importance in the pathology of the Dark Continent. It has extended southward throughout Angola, it has spread up the Niger and the Congo; and, proceeding along the new trade routes opened up by Europeans, it has suddenly appeared in East Africa, invading the shores and islands of the Victoria Nyanza.

Along the right bank of the Quanza, on the Upper Congo, round the northern and eastern coasts of Lake Victoria, the ravages of the dread disease have already been appalling. In many places entire villages have been depopulated.

The appearance of sleeping sickness in the very heart of Africa—the possibility of its spread along the Nile to Egypt, or by way of the coast to India; its terrible inexorable deadliness—called for immediate and judicious action.

At the instigation of the Foreign Office, a Commission was appointed by the Royal Society to proceed to Uganda, for the purpose of investigating the cause of sleeping sickness. The Commission consisted of Drs. George C. Low, Aldo Castellani, and Cuthbert Christy. It left London on June 10th, 1902.

In accordance with the instructions received, Dr. Low undertook to ascertain whether *Filaria perstans* had anything to do with the disease. He examined over 3,000 natives, some in areas where sleeping sickness was rife, others in areas from which it was absent, and in which it had never been known; and he definitely proved that there was no causal connection between *Filaria perstans* and sleeping sickness.

Dr. Christy studied the distribution of the disease. He found that it did not prevail all over Uganda and Busoga, as reported, but that it was strictly confined to a narrow strip along the coast-line of the Victoria Nyanza, from the Kotanza River right across to Kissumu. There it skipped a small portion, and then extended to the Gori river. The infection area did not extend for more than ten miles from the shore. Cases beyond this limit were very rare, and the patients had always a history of having come from the lake shore. The affected area included all the islands, many of which were taxed severely. Dr. Christy made a trip to Buvuma Island, and there mapped all cases in the places in which they occurred. The dots on the map showed that the distribution of the disease on the island corresponded to the general distribution of sleeping sickness. It was confined to the coast-line overgrown with bush, chiefly bananas. Dr. Christy also noticed that there was no connection between *Filaria perstans* and sleeping sickness. He observed that the disease extended about 150 miles beyond the extreme limit of *Filaria perstans*.

Meanwhile, Dr. Castellani isolated a Streptococcus from the blood and cerebrospinal fluid of patients suffering from sleeping sickness. At first he conjectured that this bacterium might be the cause of the disease, but later he noticed that it was found rarely during life, and then only in the last stages.

On November 12th, 1902, while examining some cerebrospinal fluid, obtained from a case of sleeping sickness by means of the lumbar puncture performed during life, Castellani discovered a Trypanosoma. At the moment, he did not attach much importance to this finding. He considered the presence of the flagellate a mere coincidence, and thought that it had probably arisen from admixture of blood during puncture. Subsequently, however, he observed that trypanosomes, though always few in number, were of frequent occurrence in the cerebrospinal fluid of patients suffering from sleeping sickness; and he communicated his discovery to Drs. Moffat and Baker, and afterwards to Lieut.-Col. Bruce, as soon at the latter arrived in Uganda.

Dr. Castellani's discovery was followed up very rapidly by a number of observers; and thus, in a twelvemonth, the etiology and epidemiology of sleeping sickness have been almost entirely worked out, and the deadliest scourge of Africa is under the heel of the white man's foot.

The history of this discovery is a most brilliant proof of the exactness of modern scientific medicine; and the famous boast, "*Veni, vidi, vici!*" could not find a more appropriate application.

Although we are indebted to Dr. Aldo Castellani for the discovery of the *vera causa* of sleeping sickness, it is but fair to state that the complete elucidation of the disease has been the work of numerous observers; and we should not forget the researches of the old English and French surgeons who gave us the first accounts of the malady, any more than the latest and most

[1] Read at the Epidemiological Society, December 12th, 1903.

important investigations by Bruce, Brumpt, and Manson. Our modern triumphs have deep roots, not only in the discoveries, but also in the mistakes of the past. The old dictum, "*Errando discitur*," applies to the advancement of science just as truly as it applies to the experience of life.

So far as I know, the first to describe sleeping sickness was Dr. T. Winterbottom, in "An Account of the Native Africans in the Neighbourhood of Sierra Leone," which he published in London exactly a hundred years ago. Then followed papers by Clarke, Dangaix, Nicolas, Gaigneron, Karl, Griffon du Bellay, and Santelli, who described fairly well the symptoms and the coarse anatomical features of the disease.

In 1869, Dr. P. A. Guérin published an excellent thesis on sleeping sickness. During a period of about twelve years in Martinique, Guérin had the opportunity of studying 148 cases of the disease in negroes imported from the Congo. In some cases the period of incubation lasted five years, or more. The disease did not spread to the black Creoles of the Antilles; neither did it spread to other Congolese who had been in the colony some forty years. In his Report to the Royal Society, Dr. Christy questions the correctness of Guérin's observations; but his criticism is futile. Besides, as he owns himself, he read only a summary of Guérin's paper in the *Archives de Médicine.* The so-called incubation period of sleeping sickness, like that of hydrophobia, may certainly extend over a period of two, three, or more years. A case occurred in England in a Congo boy, who had resided in this country for three years without showing any particular signs of unhealthiness.

In 1876 and 1877, Dr. A. Corre published some very interesting papers on sleeping sickness. Corre had made a special study of the disease in the severely-affected districts of Joal and Portudal in Senegambia. He laid special stress on the paludal nature of the sleeping sickness centres, and remarked that the disease may attach itself to a particular house or to a particular group of houses. He referred to the fact that patients believed they had contracted the disease during the rainy season. In his first paper, Corre conjectured that the disease might be a kind of food-poisoning, analogous to ergotism and lathyrism; but later he put it down to scrofula, on account of the frequent occurrence of glandular swellings. Corre gave an admirable description of the symptoms of the disease. He noticed that, in most cases, a regular evening rise is the characteristic temperature; he also noticed an opacity of the cornea in some cases.

In 1891, while examining the blood of a case of sleeping sickness under the care of Dr. Stephen MacKenzie in the London Hospital, Sir Patrick Manson discovered the larvæ of a new filaria, which he named *Filaria perstans*, because of the constant presence of its young in the peripheral circulation. Subsequently, he found the larvæ of *Filaria perstans* in films of blood obtained from cases of sleeping sickness on the Congo; and, in 1898, he again found them in two cases of sleeping sickness which Dr. Grattan Guinness brought over to England for the purpose of study, and which were admitted into Dr. Abercrombie's ward at Charing Cross Hospital. Struck by the constant presence of these blood-worms in cases of sleeping sickness, and by the singular correspondence which seemed to exist between the geographical distribution of sleeping sickness and that of *Filaria perstans*, and paralleling the long incubation period of sleeping sickness with the fact that *Filaria perstans* can remain alive within the body of its host years after the infection area has been quitted, Manson suggested that this filaria might possibly be the cause of sleeping sickness. When it became evident that *Filaria perstans* was present not only in cases of sleeping sickness, but also in a large proportion of the normal inhabitants of the Congo and of other parts of West Africa, Manson still held to his hypothesis, because it was supported by the pathology of *Filaria Bancrofti*. In fact, *Filaria Bancrofti* does not always cause chyluria; yet there can be no doubt that it is, within the Tropics, and in many sub-tropical countries, a frequent cause of chyluria.

The discovery of the presence of *Filaria perstans* in British Guiana was decidedly against the theory of a connection between this nematode and sleeping sickness; but the diseases of the natives of British Guiana are very little known, and Dr. Ozzard wrote that he believed sleeping sickness to be amongst their ailments; indeed, he stated that a Buck woman was brought to him for treatment, because, as her friends said, she was always asleep.

Low's recent researches in British Guiana, and the numerous and accurate observations he made in various parts of Uganda, have definitely proved that there is no causal association between *Filaria perstans* and sleeping sickness.

Drs. Hodges and Wiggins had already shown, before the Commission arrived in Uganda, that, though sleeping sickness was very prevalent in the Kavirondo Islands, *Filaria perstans*, on the other hand, was very rare. Besides, the distribution of *Filaria perstans* is very wide throughout intertropical Africa, wherever the ecological conditions are favourable. But all this information is very recent.

The suggestion that *Filaria perstans* might be the cause of sleeping sickness has proved erroneous; but the suggestion was very reasonable; and indeed, it led to the discovery of the true cause of the disease, just as an analogous mistake led to the discovery of America.

Other nematodes have been incriminated as causative agents in sleeping sickness, but on very poor grounds. Forbes ascribed the disease to *Strongyloides intestinalis*; Fergusson to *Uncinaria duodenalis.* Both worms have a very wide distribution. *Uncinaria* is almost cosmopolitan.

It would be idle to discuss the various theories put forward by the older authors to account for this strange and formidable disease. Some believed it to be a kind of nostalgia, intensified by the ill-treatment suffered at the hands of slave-dealers and planters. Others ascribed it to malaria, to sunstroke, to amenorrhœa, to inanition, to the immoderate drinking of palm wine, to the eating of raw manioc, or to the smoking of Indian hemp.

The food-intoxication theory, suggested first by Corre, then again by Pereira do Nascimento and Cal-

mette, was revived last year by Ziemann, who ascribed sleeping sickness to the eating of raw or unsuitably prepared manioc. Ziemann says that he was led to this theory by a previous study of pellagra and beri-beri, which, he affirms, are known to be diseases of intoxication. In controverting Ziemann's theory, I must begin by stating that his premise is wrong. So far, no one has actually proved that pellagra is caused by some specific toxic substance contained normally in maize; neither has anyone proved that beri-beri is due to an analogous poison in rice. Both maize and rice are perfectly healthy foods under ordinary conditions; and whatever their part may be in the natural history of pellagra and beri-beri, certainly they do not stand in the direct relation of cause and effect. Like many other food-plants now extensively cultivated in West Africa, the bitter cassava (*Manihot utilissima*) and the sweet cassava (*Manihot aipi*) were imported from South America. The areas of their cultivation and consumption in Africa do not in any way coincide with the geographical and topographical distribution of sleeping sickness. Another reason against the manioc theory is the occurrence of sleeping sickness among negroes far and long removed from the endemic centres of the disease, as in the West Indies and in Europe.

Various kinds of bacteria have been described in connection with sleeping sickness, and claimed to be the specific agents of the disease. In 1897, Cagigal and Lepierre found a bacillus in the blood of a case of sleeping sickness imported from Angola, and claimed that it was the cause of the disease. They stated that, by inoculating rabbits with cultures of this bacterium, they produced a disease resembling sleeping sickness, and yielding the characteristic organism. Brault and Lapin, who procured a culture of the bacillus, were unable to confirm these observations.

In 1899, Marchoux suggested that *Fränkel's diplococcus* might be the cause of sleeping sickness. He performed the autopsy of one case of the disease at St. Louis (Senegal) and found a diplococcus on the pericardium, but was unable to detect its presence within the cerebrospinal system. Pneumonia was very prevalent at the time.

In 1901, Broden examined several cases of sleeping sickness at Leopoldville (Congo), and found in the blood and in the cerebrospinal fluid (*post mortem*) a bacillus which grew abundantly on potatoes. This bacillus, possibly *Bacillus solanacearum*, was not agglutinated by the blood of patients suffering from sleeping sickness.

The same year, the Portuguese Government sent a Commission to Angola to investigate the etiology of sleeping sickness. Bettencourt and his colleagues isolated a streptococcus from the cerebrospinal fluid obtained by means of the lumbar puncture performed during life, or *post mortem*. The lumbar puncture was performed in nine cases. In six of these it gave positive results, the bacteria being easily isolated; in the other three, both the examination of the direct preparations and of the cultures gave negative results. The streptococcus was also found in the blood and in the lymph glands.

(*To be continued.*)

Colonial Medical Service.

Freer.—Dr. G. D. Freer, of the Straits Settlements Medical Department, and Lieutenant-Colonel E. G. Pennefather, Inspector-General of Police of the same colony, returned to their duties by the mail boat leaving London on February 5th.

Middleton.—Dr. W. R. C. Middleton has been appointed Deputy President of the Municipal Commissioners of Singapore, during the absence of Mr. W. Evans, the President, who is proceeding to the Transvaal in connection with the importation of Chinese labour.

Morris.—Dr. Sydney H. Morris, District Surgeon of Abercorn, North-eastern Rhodesia, has been transferred to Fort Jameson, and is acting as Principal Medical Officer to the Administration during the absence on leave of Dr. J. C. Spillane.

Ross.—Sir David Palmer Ross, Surgeon-General of British Guiana, who has been seriously ill for some time past, has been granted leave on full pay until March 27th. His duties have been taken over by Dr. J. P. C. Widdup, one of the Government medical officers, who becomes Acting Surgeon-General.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

The Amœba of Dysentery.

Schaudinn (*Arb. a. d. Kaiserl. Gesundheit.*, 1903, xix., Heft 3, p. 547) considers the amœba present in the healthy intestine to possess a different developmental history to the amœba met with in the case of dysentery. He proposes to name the former organism *Entamœba coli*, and the latter *Entamœba histolytica*.

The *Entamœba coli* met with in the normal intestine multiplies by simple fission and by spore-formation (schizogenesis). The formation of spores is preceded by reduction, divisions of the nucleus, and the conjugation of two daughter nuclei; mitotic (karyokinesis) division succeeds, and eight nuclei result. The protoplasm finally divides into eight sections, each section surrounding a nucleus, and eight amœbæ are formed.

In the *Entamœba histolytica* (dysenteric amœba) regular nuclear division has not been observed; the chromatin of the amœba is broken up, and the remnant of the nucleus expelled from the organism. The protoplasm of the cell arranges itself in small spherical bodies, containing a fraction of chromatin. Schaudinn has shown that these spores when given to cats cause signs and symptoms of a dysenteric nature. Jürgens (*Veröfrendl. a. d. Geb. d. Militär sanitätswesens*, 1902, vol. xx., p. 110) has shown that the *Entamœba histolytica* possesses an outer zone—an ectoplasm—of firm hyaline nature, and is always sharply defined from the inner zone.

These observations are important as means of recognition and differentiation between the normal and dysenteric amœba inhabiting the intestine.

Ankylostomiasis.

The Treatment of Ankylostomiasis. — Nagel (*Deutsche Med. Wochenschrift*, 1903, July 30th, p. 345), states that male fern is the most effectual vermifuge in ankylostomiasis. The dose of the drug is usually 10 grammes (2 drachms 49 minims), and may be given in black coffee or in capsules as a single dose; in divided doses in the following mixture:—

Extract filicis liq.	ʒiiss.
Choroform	♏x.
Syrup sennæ	ad. ℥ss.

Before giving this medicine stand the bottle containing it in hot water, so as to render the mixture sufficiently fluid to be poured out. The dose is to be followed in two or three hours by four grains of calomel or some other purgative, such as senna, rhubarb, &c. Castor oil is supposed to aid the absorption of male fern by the stomach, and is usually avoided. Prof. Jacquet, of Basle, has recently introduced a preparation which he terms filmaron, from which the toxic elements of the drug have been extracted, but the vermicide principles left intact. The preparation may be given as a mixture, filmaron 0·70, chloroform 1·50, ol ricini 20·0; a couple of doses of this compound is sufficient. Thymol may be given with the "filmaron," in the proportions of thymol 5·0, filmaron 0·7, chloroform 1·5, ol ricini, 20·0. Of other vermicides in ankylostomiasis santonin is too weak; thymol in 2 drachm doses daily is effectual, but causes occasionally toxic effects; kousso, kamala, and decoction of pomegranate bark are useless.

Intestinal Parasites.

The occurrence of more than one Tænia Saginata in the Same Person.—Riehl (*Munchener med., Wochens.*, December 29th, 1903) found two heads of the *Tænia saginata* in a patient's stool after two doses of male fern. It is extremely rare to find more than one *Tænia saginata* (the beef-worm) in the same person.

Oxyuris Vermicularis.

Hellar, A. (*Deut. Archiv f. Klin. med.*, lxxvii., Bd. 1 *u* 2 Heft., p. 21), states that the whole cycle of development of the thread worm is completed in one stage in the human alimentary canal. The mature eggs when swallowed set free the embryos as soon as they enter the stomach. In the upper part of the small intestine the worms reach maturity, they copulate in the lower part of the small intestine, and the impregnated females deposit their ova in the cæcum and vermiform appendix and the large intestine. In the rectum and in the anal folds ova are deposited, causing itching and scratching. The ova, or even the worm itself, gets in beneath the nails, and are thus conveyed to the mouth, when the whole cycle is repeated. The female oxyuris may travel over the skin to the axilla, laying eggs all the way; this is especially likely to happen in warm climates when the skin is covered by sweat.

Treatment.—It is plain from a study of the life history of this parasite that it is futile to hope to cure it by enemata alone. The breeding ground is higher than the enema can reach, namely in the small intestine. It is therefore necessary to give (1) a purgative to clear away the mucus protecting the parasite in the intestine; calomel followed by a saline will best accomplish this; (2) an anthelmintic such as santonin in single or repeated doses; (3) a purgative some hours after the santonin has been administered, followed by a large enema of soap and water; (4) this treatment should be repeated in a week's time; (5) the stools of all members of the family should be examined for the ova of oxyuris, as one infected person may spread the disease to others.

Plague.

Prevalence of the Disease.

India.—During the week ending January 9th, the deaths from plague in India amounted to 17·344, and during the week ending January 16th to 21·302.

Cape Colony.—During the weeks ending January 9th and 16th, the plague reports were: Port Elizabeth, fresh cases 2, deaths, 2. East London, fresh cases, 1, deaths, 1.

Mauritius. — During the weeks ending January 21st, 28th and February 4th, the fresh cases of plague numbered 16, 28, and 17, and the deaths from the disease 12, 18, and 14 respectively.

Trypanosomiasis.

Trypanosomiasis of Horses in the Philippines.—Musgrave, W. E., and Williamson, N. E., in the Biological Report (Sept., 1903) of the Government Laboratories, U.S.A., published a Preliminary report on Trypanosomiasis of Horses in the Philippine Islands. The authors stated that the horse is very liable to be attacked; cattle and carabao rarely, if at all, suffer. They hold that infection is conveyed by way of an open wound of the skin, or through the wound made by an insect; but they consider that the part played by the insect is mechanical merely, and that it does not act as an intermediary host.

Schaudinn, F. Generations und Wirtswechsel bei Trypanosoma und Spirochaete. *Arbeit. a. d. Kaiserl. Gesundheit.*, 1904, vol. xx., part 3.

Prowazek, S. Die Entwicklung von Herpetomonas einem mit den Trypanosomen verwenden flagellata. (Vorlänfige mitteilung.) *Arbeit. a. d. Kaiserl. Gesundheit.*, 1904, vol. xx., part 3.

Yellow Fever.

After the last epidemic of yellow fever in Senégal (April, 1900), representations from all the public bodies in Senégal asked that a commission should be sent to Rio de Janeiro to study yellow fever. Messieurs Marchoux, Salimberri and Simond, at the instance of the Pasteur Institute, were sent to make investigations. They have just published a voluminous report in the *Annals of the Pasteur Institute*, No. 8, 1903, in which the following conclusions are arrived at:—

(1) The blood serum of a patient suffering from yellow fever is virulent on the third day of the attack.

(2) On the fourth day the blood serum no longer contains the virus, even though the fever has increased.

(3) One-tenth of a cubic centimetre of virulent serum injected beneath the skin is sufficient to bring on an attack of yellow fever.

(4) The virus of yellow fever placed upon an excoria-

tion of the skin (made by denuding the epidermis) will not produce the fever.

(5) In the serum of the patients the virus of yellow fever will pass through a Chamberlain F. bougie without being diluted.

(6) Under the same conditions it does not seem to be able to pass through a B. bougie.

(7) The virulent serum kept at a temperature of 24-30° C. is useless at the end of forty-eight hours.

(8) In the defibrinated blood kept under vaseline oil at a temperature of 24-30° C., the infective agent of yellow fever still lives at the end of five days.

(9) At the end of eight days the defebrinated blood maintained under the same conditions no longer contains active virus.

(10) The virulent serum becomes useless after a heat of 5′ to 55° C.

(11) A preventive injection of serum heated from 5′ to 55° C. gives a relative immunity, which, followed by the inoculation of a very small quantity of the virus, ought to become complete.

(12) The injection of defibrinated blood, preserved in the laboratory under vaseline oil for eight days or less, gives a relative immunity.

(13) The serum of convalescence is clearly endowed with preventive properties.

(14) The immunity conferred by a convalescent's serum is still appreciable at the end of twenty-six days.

(15) The convalescent's serum appears to possess therapeutic properties.

(16) As proved by Reed, Carrol and Agramonte, yellow fever is caused by the sting of the *Stegomyia fasciata*.

(17) To be able to determine the illness in man, the mosquito should be infected previously by absorbing the blood of a patient struck down with yellow fever during the first three days of the attack.

(18) The mosquito is not dangerous until after an interval of at least twelve days have elapsed since it absorbed the virulent blood.

(19) The bite of two infected mosquitoes produces a very serious condition.

(20) The mosquito bite is much more dangerous when it occurs later than the moment at which the insect is first infectious.

(21) The bite of infected mosquitoes does not necessarily cause yellow fever.

(22) When the bite of a mosquito is without effect it does not prove that there is immunity against a virulent infection.

(23) In the region of Rio de Janeiro, as in Cuba, no other Culicidæ than the *Stegomyia fasciata* appears to co-operate in the transmission of yellow fever.

(24) Contact with a patient, his effects, or excretions, is incapable of producing yellow fever.

(25) Apart from the bite of the infected Stegomyia, the only known means of conveying the poison is by injection into the tissues of an immune person, of blood procured from a patient, and collected during the three first days of the attack.

(26) Yellow fever only shows a contagious character in those regions where *Stegomyia fasciata* abound.

(27) The prophylaxis of yellow fever rests entirely upon those measures taken to prevent the *Stegomyia fasciata* biting the sick or healthy man.

(28) The fact must be borne in mind that the incubation period of yellow fever can be as prolonged as thirteen days.

(29) The *Stegomyia fasciata* is frequently found as a parasite on mushrooms, yeast, &c., although parasites of this kind have no connection with yellow fever.

(30) Neither in the mosquito nor in the blood of man has the agent of yellow fever been found.—From *Le Caducée*, Dec. 19th, 1903.

G.

Notes and News.

A SIMPLE and accurate method of examining the stools for gallstones and other solid bodies is given in the *Med. Rec.*, 1904, January 9th, by H. Lilienthal: Take a loop of telegraph wire a few inches greater in diameter than the entire top of the closet seat, and fasten to this a bag of at least two thicknesses of dressing gauze or mosquito netting. The bag may be sewn to the wire or simply held by safety pins, but it should be made very full, so that when the hoop is in place the wire shall be well below the level of the seat and out of the way, while the bag shall hang down into the water at the bottom of the bowl. If the patient is not confined to bed he defæcates into the closet, and then simply opens the water valve often enough to wash away all soluble and amorphous matter, while solid bodies will be left in the bag. If the patient is cónfined to bed, the stool must, of course, be carried to the closet. It is best not to put paper in with the stool. In rural districts where there may be no plumbing the same procedure may be followed, except that the water must be carried to the privy and poured through by hand. The principal advantage of this method, especially in city practice, is that the patient himself may be trusted to make an absolutely accurate examination. I have been able to confirm a diagnosis of cholelithiasis from tiny faceted stones considerably smaller than a mustard seed, which were discovered in the stools by the patient.

SEA-SICKNESS.—Many remedies have been proposed lately as a means of preventing sea-sickness. Dr. Dunlop (*Lancet*, Jan. 23rd, 1904) advocates chloretone in 5-grain capsules, two of which are to be taken before setting out, and repeated every two hours if sea-sickness threatens.

THE Anglo-American Nursing Home at Rome seems to be fulfilling a useful purpose and supplying a real want.

THE Anglo-American Hospital at Cairo was opened by Lord and Lady Cromer on January 21st, 1904.

THE South African Medical Congress has just held a Congress at Cape Town. It is the first meeting of the Congress since the outbreak of war in the Transvaal. By a resolution of the meeting a Medical Guild for South Africa was decided upon.

Literary References.

TROPICAL DISEASES.

CHOLERA ASIATICA.

Amaka, Osaragi and **Terada.** [Researches on the Cholera, which prevailed at Kobe in 1902], *Tokio Iji Shinshi*, 1903, pp. 1381, 1434, 1471.

Asiatic Cholera [in the Philippines], Rep. Surg. Gen. Army, Wash., 1902-3, p. 77.

Blackford, C. M., junr. Fighting Cholera in Manila, *Med. Fortnightly*, St. Louis, 1903, vol. xxiv., p. 711.

Bowie, R. T. Preventive Inoculation against Cholera, Public Health Report, U.S. Mar. Hosp. Serv., Wash., vol. xviii., p. 16.

Busch. Bericht über das cholerazarett Shin-fany-tse der provisorischen Regierung Zu Tientsin von seiner Etablierung am 13 Juni bis zur uebergabe an die chin esische Regierung am 15 August, 1902, *Deutsche mil-ärztl. Ztsehr.*, 1903, vol. xxxii., p. 129.

Bussière, T. A. Le Choléra asiatique dans les établissements francais de l'Inde in 1900, causes de ses manifestations endémo-épidémique ; mesures prises par le service de santé de la colonie, *Ann. d'hyg. et de méd. colon.*, Paris, 1903, vol. vi., p. 143.

Cholera in Cebu ; Circular relative to Quarantine Restrictions. Public Health Report, U.S. Mar. Hosp. Serv., Wash., 1903, vol. xviii., p. 1403.

Cholera in the Turkish Empire, *Lancet*, 1903, Jan. 31st and April 11th.

Cholera Outbreak at Mariveles ; Recurrence at Iloilo, Public Health Report, U.S. Mar. Hosp. Serv., Wash., 1903, vol. xviii., p. 1681.

Cholera Situation in Manila ; probable Infection of the Passig River, Public Health Report, U.S. Mar. Hosp. Serv., Wash., 1903, p. 1121.

Cholera (The) Epidemic of Syria, *Lancet*, 1903, Oct. 10th.

Egypt ; Management of the Cholera Epidemic, Public Health Report, U.S. Mar. Hosp. Serv., Wash., 1903, vol. xviii., p. 151.

Epidemic Cholerine at Barcelona [Spain], Public Health Report, U.S. Mar. Hosp. Serv., Wash., 1903, vol. xviii., p. 764.

Felletar, E. Hanyszekeles (Cholera) auto-suggestion inducing consequences leading to accusation of Poisoning, *Gyogyaszat*, Budapest, 1903, vol. xliii., p. 196.

Fukuhara, K. The Serum Treatment of Cholera, *Saitake Gaku Zasshi*, Tokio, 1903, p. 26.

Fullerton, E. B. The Quinine Treatment of Cholera, *Med. Rec.*, N.Y., 1903, vol. lxiii., p. 668.

Granville, A. Dislocation of the Lower Jaw by Muscular Cramp in Cholera, *Brit. Med. Journ.*, 1903, May 2nd.

Hirschbruch and **Schwer.** Die Choleradiagnose mit Hilfe eines Spezialagars, *Centralbl. f. Bakteriol.*, 1 Abt., Jena, 1903, vol. xxxiv., p. 585.

Ichikawa. Klinische Beobachtungen über die Cholera-epidemie in Osaka, 1902 [Ausz., Hft. 13.] [Japanese text], *Mitt. d. med. Gesellsch. zu Tokyo*, 1903, vol. xvii., pp. 547 and 587.

Imamura. Ueber das Cholera, Heilserum von Densenbyo Kenkyusho, *Mitt. d. Med. Gesellsch. zu. Tokyo*, 1903, vol. xvii., p. 171.

Imamura, H. Remarks on the Blood Serum of Cholera in the Researches on Infectious Diseases, *Iji Shinbun*, Tokyo, 1903, p. 17.

Kanahara, S. The Application and Value of Agglutinative Reaction on the Differentiation of the Cholera Bacillus and the Preparation and Choosing of the Serum, *Tokyo Iji-Shinshi*, 1903, pp. 521 and 559.

Kaneki, M. The Kinds of Vibriones in the Fæces of a Patient suffering with Vomiting and Purging, *Saitake Gaku Zasshi*, Tokyo, 1903, p. 31.

Kharitonoff, L. A. New Method of treating Asiatic Cholera, *Voyenno Med. Journ.*, St. Petersburg, 1903, vol. lxxxi., p. 247.

Kohara, K. Report of Researches on the Microbe of Cholera in Japan, *Kokka Igaku Kwai Zasshi*, Tokyo, 1903, p. 508.

Kolle, W. Ueber den jetzigen Stand der Choleradiagnose, *Klin. Jahrb.*, Jena, 1903, vol. xi., p. 357.

Kolle, W., and **Gotschlich, E.** Untersuchungen über die Bakteriologische Choleradiagnostik und Specifität des Koch'schen Choleravibrio. Unter Mitwirkung von H. Hetsch, O. Lentz und R. Otto, *Ztschr. f. Hyg. u. Infectionskr.*, Leipz., 1903, vol. xliv., p. 1.

Koumoulis, E. Des Microbes des billets de banque grecs et notamment de la transmission du spirille de Choléra par eux, *Grèce méd.*, Syra, 1903, vol. v., p. 48.

Lasserre. Le Choléra à bord de la Comète, *Arch. de méd. nav.*, Paris, 1903, vol. lxxx., p. 81.

Legrand, H. La défense de l'Egypte contre le choléra, *Caducée*, Paris, 1903, iii., p. 262.

Long, J. D. Outbreak of Cholera at Mariveles and Measures for Suppression, Public Health Report, U.S. Mar. Hosp. Serv., Wash., 1903, vol. xviii., p. 1744.

Manouvriez, A. Choléra saisonnier paraissant dû à un régime végétarien spécial. *Echo méd. du nord*, Lille, 1903, vol. vii., p. 281.

Mastermann, E. W. G. The Cholera Epidemic of last Autumn in Palestine, *St. Bartholomew's Hospital Journ.*, 1902-3, vol. x., p. 62.

Masuyama, M. Results of the Serum Treatment in Cholera, *Tokyo Iji-Shinshi*, 1903, p. 353.

Matthews, E. A. C. Report on a small outbreak of Cholera in June, 1903, *Ind. Med. Gaz.*, Jan., 1904, p. 14.

McLaughlin, W. B. A Study of Nature's method for the Cure of Asiatic Cholera, *Texas Med. Journ.*, Austin, 1902-3, vol. xviii., p. 412.

Mitra, A. Cholera Epidemic in Kashmir, 1900 ; Epidemic, how Introduced, and Precautionary Measures, *Indian Lancet*, 1903, vol. xxii., p. 42.

Moreschi, C. Diastasi ed antidiastasi proteolitica del Vibrio choleræ, *Gior. d. r. Soc. ital. d'ig.*, Milano, 1903, vol. xxv., p. 157.

Orefice, E. Intorno alla etiologia del colera infantile, *Pediatria*, Naples, 1903, 2. s., i., p. 624.

Oya, Vergleichung der Agglutinations reaction bei verscheidenen Cholerafällen, *Mitt. d. med. Gesellsch. zu.*, Tokio, 1903, vol. xvii., p. 164.

Perry, J. C. Philippine Islands, Cholera situation, Public Health Report, U.S. Mar. Hosp. Serv., Wash., 1903, vol. xviii., p. 108.

Pick, E. P. Cholera Immune Bodies, Ueber den Gehalt der einzelnen eiweissfraktionen des Serums an Choleraimmunkörpern, Reply by A. Wolff, *Centralblatt. f. Bakteriologie*, Jena., vol. xxxiv., No. 3.

Ueber den Gehalt der einzelnen Eiweissfraktionen des Serums an Choleraimmunkörpen ; eine Entgegnung an Herrn A. Wolff, *Centralbl. f. Bakteriol.* (&c.), 1 Abt., Jena, 1903, vol. xxxiv., p. 556.

Proust, A., and **Faivre, P.** Choléra en 1901 [Rap.], *Rec. d. trav. Comité consult. d'hyg. pub. de France* 1901, Paris, 1903, vol. xxxi., p. 343.

Report of Cholera occurring in Provincial Towns in the Philippine Islands for the week ended June 20, 1903. Public Health Report, U.S. Mar. Hosp. Serv., Wash., 1903, vol. xviii., p. 1360.

Saito, Y. Researches on the Agglutination of Cholera Vibriones, *Saitake Gaku Zasshi*, Tokio, 1903, p. 145.

Sen, H. Cholera in the District of Puri, with a special account of the Epidemic during the year 1901, *Indian Med. Gaz.*, 1903, vol. xxxviii., p. 135.

Smythe, G. F. A. The late Cholera Epidemic in Egypt, *Dublin J. M. Sc.*, 1903, vol. cxvi., p. 4.

Strong, R. P. A New Cholera Vaccine and its Method of Preparation, *Amer. Med.*, Philadelphia, 1903, vol. vi., p. 272.

Tsuzuki, J., and **Miyasaki, K.** Ueber einen zur Anreicherung der Choleravibrionen passenden Nährboden (Tsuzukis. R-Peptonwasser) und seine Bedeutung bei der Bakteriologischen Choleradiagnose, *Arch. f. Schiffs. u. Tropen Hyg.*, Leipzic, 1903, vol. vii., p. 311.

Wolff, A. Bemerkungen zu vorstehender Entgegnung [von E. P. Pick] *Centralbl. f. Bacteriol.*, 1 Abt., Jena, 1903, vol. xxxiv., p. 557.

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CONTENTS.—MARCH 1st, 1904.

Original Communications.

CANINE MALARIA.

By A. B. Dalgetty, M.D., D.P.H.
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It is daily becoming more evident, as was notified in the Journal of December 1st, that we must study more closely the diseases of animals if we are to properly understand those of man. It is for this reason that I send you the following account of a blood parasite, apparently malarial, which I have met with in a dog, the more so since little has been done in this direction, so far as I know, and because of the close association between man and the dog and the possibility of inter-infection.

The dog in question is a white fox terrier which I got as a pup seven months old, at the beginning of November, 1903. About a fortnight after I got him I noticed one day that his eyes looked pale and that he seemed out of sorts. He got better, but a few days later he again showed signs of illness, lassitude, want of appetite and anæmia, and his skin felt hot to the touch. Then on November 29th, after his bath, he fell down in a faint and passed involuntarily a quantity of blood-red urine. These fainting attacks and passing of red urine continued for the next three days, after which he recovered to some extent, but the anæmia was now very marked and the least exertion brought on a fainting attack. He would fall over with a thud, wherever he was, and after lying a few seconds would raise his head and look round in a dazed fashion, and when he got up he would stagger a little in his walk.

The next attack occurred about eight days afterwards with the same symptoms, lassitude, loss of appetite, anæmia and red urine; the temperature I found was 103·2 F., nearly 3° above normal.

I examined his blood during this attack, thinking that the disease might be of a malarial nature, and found abundant evidence that this was the case. A fresh unstained film, ringed with vaseline and examined immediately with a $\frac{1}{12}$in. oil-immersion lens, showed a considerable number of free, actively moving, round or oval spore-like bodies making their way amongst the blood corpuscles. These bodies appeared to be about a quarter the diameter of a red blood cell, round in outline when at rest, but somewhat oval when moving in amœboid fashion. They were fairly numerous and could be seen without much difficulty even in unstained specimens, but owing to their activity little could be made out regarding their structure.

A specimen stained by Jenner's method brought out these parasites very distinctly as faintly blue, slightly oval bodies lying here and there outside the blood corpuscles; their diameter was a quarter to one-third that of a red cell; their outline was distinct and was separated from the central part by a clearer, less stained zone, while the centre was distinctly more deeply stained than the rest of the body. Almost all these parasites were extra-corpuscular, but I came across one or two intra-corpuscular specimens. One of these shows itself as a round, clearly defined, deeply stained blue body lying within and towards one side of the pink stained red blood corpuscle; while within the parasite itself is a second small ring touching one side and enclosing a minute space which is less deeply stained than the rest of the parasite.

The infected corpuscles were paler than the others but not increased in size. The parasite looked larger outside than inside the blood cell. No sporulating or other intra-corpuscular form was found; the ring-shaped appearance recalls the parasite of malignant malaria. One blood-count gave 2,800,000 per cmm., and another 3,000,000 per cmm. I had no means of estimating the percentage of hæmoglobin, but judging from the paleness of the blood-drop it was very low.

An examination of the blood-coloured urine, passed during one of the attacks, showed no red corpuscles, hence the colour must have been due to the presence of hæmoglobin alone; this shows that the destruction of blood cells must have been very great and explains the intense anæmia. The spleen could not be felt; the heart sounds were irregular, three slow beats being followed by four or five in quick succession.

Quinine in 2 to 3 grain doses was given daily for some time and the immediate improvement showed that the disease was of a malarial nature. The fever and lassitude disappeared, appetite returned, and the animal became quite lively again. But as soon as the quinine was left off for a few days a relapse occurred and the old train of symptoms recurred, only the attacks have seemed milder and the hæmoglobinuria has not appeared. I give the quinine in the folds of a small piece of meat, he does not seem to taste the bitterness very much.

Since there is little doubt that the disease is due to a malarial parasite, it is an important question to consider whether the dog might not be one source of infection to man, considering the closeness of intercourse between them.

The presence of hæmoglobinuria in this case is also worth remembering in connection with the causation of blackwater fever in man.

THE ELUCIDATION OF SLEEPING SICKNESS.

By Dr. Louis Sambon.

(*Continued from p.* 63.)

Castellani also found a streptococcus in the blood and cerebro-spinal fluid of patients suffering from sleeping sickness, but only in the last stages of the disease. Indeed, he grew it once only from the blood, although he examined bacteriologically the blood of thirty-seven patients, and in each case repeated the investigation several times, and with different methods. He examined the cerebro-spinal fluid obtained by lumbar puncture in twenty-eight patients, but only five cases gave a positive result, and four of these were examined a few hours before death. Out of six bacteriological examinations of urine, he grew the microbe once. Bacteriological examinations of enlarged lymphatic glands removed during life were negative, and the examination of the spleen juice obtained by puncture during life was likewise negative.

Probably Castellani's streptococcus is identical with the microbe described by the Portuguese Commissioners. The latter first stated that their diplo-streptococcus grew very poorly on the ordinary culture media, and that they had never succeeded in obtaining cultures on gelatine. After Castellani's publication, however, they modified this statement, and affirmed that their streptococcus grows very well on gelatine.

Castellani believes that the streptococcus he has found in cases of sleeping sickness is merely a variety of *Streptococcus pyogenes*. He is inclined to think that this organism may play a part in the etiology of sleeping sickness, similar to that of the streptococci associated with the complications of scarlet fever and rheumatic polyarthritis

The bacteria so far described in connection with sleeping sickness have probably no causal connection with the disease; they are seldom found in the early stages of the disease; they are often absent in the last. The two cases of sleeping sickness which were brought to London in 1898 were very carefully examined with regard to bacteria. Dr. Bullock attempted to make cultures from the blood and from some enlarged cervical glands which were removed during life, but none of the cultures had grown at the end of three weeks; he therefore came to the conclusion that no ordinary micro-organisms were contained in the blood or glands. At *post mortem* the cerebro-spinal fluid was examined for micro-organisms by cultures, &c., and various organisms, including diplococci, streptococci, and bacilli were found; but, of course, no importance could be attached to these observations.

The question of the *rôle* played by streptococci in scarlet fever and other infections is a very difficult one, and recent researches by Aronson and others show that we are further than ever from its solution.

A very important step in our knowledge of sleeping sickness was the study of its minute anatomical features. The first detailed microscopical examination was that which Regis and Gaid published in 1898. These authors correctly attributed the symptoms of sleeping sickness to a diffuse meningo-encephalitis; but their observations referred to a single case in the region of Timbuctoo.

In 1900, Dr. Frederick Mott published the changes he had found in the central nervous system of two cases of the disease, and remarked that sleeping sickness is due "to a poison of micro-parasitic or other source, which affects especially the lymphatic system, and in particular that portion of it pertaining to the central nervous system." Mott's excellent observations were confirmed by the Portuguese Commissioners in 1901, and by Warrington in 1902.

The chief characteristics after death from sleeping sickness are: general emaciation, enlargement of the lymphatic glands, slight opacity and thickening of the pia arachnoid, and serous effusion into the meshes of the pia mater or into the ventricles. The microscope reveals an intense chronic meningo-encephalo-myelitis.

The emaciation is very marked in certain cases, especially on account of starvation. The enlargement of the lymph glands is constant, and may be noticed in the cervical, axillary, mesenteric and inguinal groups. In the cerebro-spinal system the macroscopical changes are seldom marked. In most cases there is only a slight opacity of the pia arachnoid over the convexities, and some serous exudation in the sub-arachnoidal space. In some rapid cases the exudate may be considerable in amount. As a rule, it is slightly turbid, but never purulent unless the disease be complicated by streptococcic invasion. The vessels of the brain do not show any appreciable abnormality, but there may be a marked congestion of the arteries and veins of the dura mater. The cerebro-spinal fluid may be slightly turbid, but seldom in excess. The ventricles are rarely dilated. The brain substance is of normal consistence, and, as a rule, the convolutions are neither flattened nor wasted.

Puncta cruenta are rarely marked in the cut surface of the cerebrum. The medulla shows to the naked eye marked congestion of the vessels.

The microscope shows the pia arachnoid infiltrated with mononuclear leucocytes; the inflammation is seen throughout the whole central nervous system, but especially in the medulla and at the base of the brain. It can be traced along the blood-vessels and septa into the substance of the nervous system. The perivascular lymphatics around both large and small vessels are crowded with these lymphocytes. The cells of the cerebral cortex show a normal outline; but scattered through the substance, especially in the pericellular spaces, are the small round nucleated cells.

The enlargement of the lymph glands throughout the body, and the enormous accumulation of mononuclear leucocytes within the perivascular lymphatics of the cerebro-spinal system, indicate that the specific agent of sleeping sickness is essentially a parasite of the lymphatics; but that it is capable of damaging the nervous elements, either by mechanical action, or possibly by elaborating a special toxin.

Castellani's discovery of a trypanosome in the cerebro-spinal fluid of patients suffering from sleeping sickness marked a new era in the study of this fearful disease, and suggested a very definite line of research with regard to its etiology, epidemiology, and prophylaxis.

For some years trypanosomes had been the object of very active researches, and a large amount of knowledge had been accumulated. Castellani's discovery brought all this knowledge to bear on sleeping sickness; and thus in less than a year the elucidation of sleeping sickness becomes the boast of modern scientific medicine.

The genus *Trypanosoma* was established by Gruby in 1843; but the wimble-like hæmatozoa included in this division were first described in 1841 by Valentin, who discovered them in the blood of a trout (*Salmo fario*), and the following year by Gulge, who found them in frogs. Since then numerous species have been described from fish, batracians and birds.

The first to find these parasites in mammals was Dr. Timothy Lewis, who, in a sadly short career, has so largely contributed to the advancement of tropical medicine. Lewis found them in 1879 at Calcutta in the blood of rats (*Mus decumanus* and *Mus rufescens*). The rat trypanosome, very appropriately called *Trypanosoma Lewisi*, has a world-wide distribution corresponding with the cosmopolitanism of its mammalian host. But its prevalence varies greatly in different localities. The researches of Rabinowitsch and Kempner, and those of Laveran and Mesnil, have greatly advanced our knowledge of this flagellate. Similar parasites have been found in hamsters, guinea-pigs, rabbits, and other rodents.

In 1880, in the Punjab, Griffith Evans discovered in the blood of horses a trypanosome of a far greater pathological importance. The horses examined by Evans were suffering from surra, a disease known to the natives of India from time immemorial, and ascribed by them to the bite of certain *Tabanidæ*. The surra parasite (*Trypanosoma Evansi*) is not limited to horses and mules, but attacks also camels, elephants, buffaloes and dogs. Experimentally it has been conferred to monkeys, rabbits, rats, mice and guinea-pigs. "Surra" has a very wide distribution in Southern Asia and in Malaya. It has been found by the Germans in East Africa, and, quite recently, by the Americans in the Philippine Islands. Evans was favourable to the popular opinion which ascribed the transmission of the disease to certain blood-sucking flies; but subsequent authors, and especially Lingard, considered food and drinking-water to be the true vehicles of the infection.

The discovery of a trypanosome in surra, the fly disease of India, was followed by the discovery of a trypanosome in nagana, the fly disease of Africa.

The fly disease of Africa has been known as long as the fly disease of India. James Bruce, in his famous "Travels to Discover the Source of the Nile," mentions a tsetse-fly under the name of "Tsaltsalya," or "Zimb," and describes its terrible ravages amongst horses and cattle, during the rainy season, on the Upper Atbara River, on the confines of the Soudan and Abyssinia. In South Africa "nagana" has long been known to Europeans as the "fly disease."

Dr. Livingstone, in his "Missionary Travels and Researches in South Africa," gives much information regarding tsetse-flies and the disease they inoculate. After describing the symptoms of nagana, he very correctly says: "These symptoms seem to indicate what is probably the case—a poison in the blood, the germ of which enters when the proboscis is inserted to draw blood. The poison-germ, contained in a bulb at the root of the proboscis, seems capable, although very minute in quantity, of reproducing itself."

In 1879, Dr. J. J. Drysdale, after referring to Manson's discovery of the transference of *Filaria Bancrofti* by mosquitoes, says: "It is possible that we have here an explanation of the destructive power of the tsetse-fly, for it may be the intermediate host of some similar blood parasite; or it may be the carrier of some infective poison. It is highly improbable that any mere poison or venom should exist so powerful as to cause the death of a large animal in such small dose."

A Swiss entomologist named Schoch, in 1883, and A. Laboulbène, in 1888, again expressed the opinion that the tsetse is not poisonous in itself, but that it acts as a carrier of pathogenic micro-organisms.

In the short time at my disposal it would be impossible for me to mention the numerous authors who have contributed to our knowledge of the African fly disease. These authors described very accurately the symptoms of nagana—its coarse anatomical lesions, its peculiar distribution, the immunity of local wild animals, the structure, distribution, and life-habits of its carrier, the tsetse-fly.

At last, in 1895, Surg.-Major—now Lieut.-Col.—David Bruce went to Zululand to investigate nagana, and found that the specific parasite of the African horse disease was a trypanosome similar to the one found by Evans in surra fifteen years previously. Kanthack, Durham, Blanford, Plimmer and Bradford made a more complete study of the parasite, and the latter two named it *Trypanosoma Brucei*. Then fol-

lowed numerous investigations by Laveran and Mesnil, by Koch, by Rabinowitsch and Kempner.

Lieut.-Col. Bruce made several experiments to prove that the disease was transmitted from infected to normal animals by means of the bite of tsetse-flies. This point, however, had already been investigated some time ago; in fact, in 1857 Livingstone wrote: "The curious feature in the case—that dogs perish, though fed on milk, whereas the calves escape so long as they continue sucking—made us imagine that the mischief might be produced by some plant in the locality, and not by the tsetse. But Major Vardon, of the Madras Army, settled that point by riding a horse up to a small hill infested by the insect, without allowing him time to graze; and though he only remained long enough to take a view of the country, and catch some specimens of tsetse on the animal, in ten days afterwards the horse was dead."

In Southern Europe, and right round the Mediterranean basin, we also find a trypanosome infection peculiar to horses, and known since the beginning of the nineteenth century under the names of dourine and *maladie du coït*. The parasite *Trypanosoma equiperdum* was first discovered by Chauvrat in 1892.

Another trypanosome disease of horses is the mal de Caderas, which ranges over a wide area in South America. The parasite was discovered in 1901 by Dr. Elmassian, an old student of the Institut Pasteur. Voges gave it the name of *Trypanosoma equinum*.

To complete the list of trypanosomes so far described in the domesticated mammals, I must mention the large trypanosome found by Theiler in 1903, in the so-called "gall-sickness" of South African cattle, and named by Col. Bruce *Trypanosoma Theileri*.

A very important question is to determine whether all these variously-named and variously-distributed diseases are distinct morbid entities or not.

The "gall-sickness" of South Africa appears to be a specific disease affecting only cattle. Its parasite, *Trypanosoma Theileri*, attains greater dimensions (30 to 65 μ) than the other trypanosomes. We should not forget, however, that the same species of trypanosome presents different dimensions in different host-species. Thus, *Trypanosoma Brucei*, which measures about 26 μ in the rat, attains a length of from 28 to 33 μ in the horse.

Mal de Caderas seems likewise to be a separate disease. *Trypanosoma equinum* is easily distinguished from the other trypanosomes by the fact that its micronucleus is almost invisible on account of its very small size, and because, in stained specimens, it does not acquire a deep colouration, but stains faintly, like the flagellum.

As to the trypanosomes of surra, nagana, and dourine, it is not possible to distinguish them morphologically. Dourine seems to differ somewhat symptomatically from surra and nagana. Dogs may recover from its attacks, and the animals which have acquired immunity against dourine are not immune to surra and nagana.

Surra and nagana are strikingly alike. They affect the same animals, they give rise to the same symptoms, they cause the same anatomical lesions. Their identity, suggested by Koch, Schilling and others, seems therefore quite possible.

In distinguishing between trypanosomes, much importance has been attached to experiments of inoculation into other animals; but we should not forget the frequent fallaciousness of such experiments. Different investigators have often obtained opposite results. Different species of oxen, horses or dogs may exhibit a very different degree of susceptibility. Then, again, the passage of the parasite through certain animals may greatly alter its virulence, and even modify its aptitude for the original host. This all-important fact, which has been thoroughly ascertained in the laboratory, should not be lost sight of in epidemiological investigations.

It is a general law in parasitism that parasites become more and more adapted to the host-species they inhabit. In time they become so specialised—so greatly modified and changed—that they are absolutely dependent upon such hosts, and are unable to thrive in any others. Sometimes the limitation to certain hosts is not associated with any apparent structural change, and naturalists have proposed to call "biologic species" those species which cannot be distinguished by morphological characters.

An example, which shows how such limitations may arise, is that of the stem eel-worm (*Tylenchus devastatrix*). This nematode lives and reproduces in various cultivated plants, such as rye, oats, stored onions, hyacinths, buckwheat, potatoes and clover; and in wild plants such as *Poa annua*, *Anthoxanthum odoratum*, *Dipsacus silvestris* and *Polygonum persicaria*, but not to the same extent in all. However, eel-worms, of which the progenitors have developed for many years exclusively in rye and buckwheat, are not easily transferred to another kind of plant; or at any rate they do not multiply vigorously there.

Various blood-sucking insects have been incriminated as carriers of the different trypanosome infections, but the information so far at hand is very scanty and most unsatisfactory. Rat-fleas are believed to be the carriers of *Trypanosoma Lewisi*, because living trypanosomes have been found in the mid-gut of these insects. McNeal and Novy saw living specimens of *Trypanosoma Lewisi* in the stomach of rat-lice. Dourine is generally believed to be acquired by direct contact with the secretions of the œdematous genital mucosæ of infected animals; but Rabinowitsch and Kempner found the trypanosomes of dourine in the stomachs of fleas. They think, therefore, that dourine may be also due to the agency of blood-sucking insects. For the surra trypanosome, certain Tabanidæ have been incriminated by Rogers as its carriers in India. Curry found the surra trypanosome of the Philippines in the mid-gut and proboscis of *Stomoxys calcitrans*. In 1898, Captain A. C. Haslam, at Machakos, found the living trypanosomes of nagana in the stomach of specimens of two species of Stomoxys, caught sucking the blood of mules suffering from the disease. Lignières found the trypanosomes of mal de Caderas in the stomach of *Stomoxys calcitrans*, and Sivori and Lecler stated that they allowed sound horses to be bitten by these flies, and obtained positive results. Lignières, however, failed to obtain infection of horses with mal de Caderas by means of either *Tabanidæ* or *Stomoxys calcitrans*. Lastly, Theiler found living trypanosomes in the stomach of specimens of *Hippobosca rufipes*

and *Hippobosca maculata* fed on cattle suffering from "gall sickness." He decided, therefore, to try the infection of cattle by the medium of the fly's bite. For this purpose some flies were fed on the groins of an infected calf, and then placed on a healthy animal. To give the experiment every chance of success, the place where the flies were put to feed was first shaved, as was also the spot on the normal animal where they were placed for infection. Feeding by turns on a sick and on a clean animal was thus repeated several times. Out of four experiments made in this way, two were successful.

Turning now to the discovery of trypanosomes in man, we find that the first to describe trypanosomes in man was Dr. Nepveu.

Dr. Nepveu found these flagellates in Algeria, in 1890, while studying malaria parasites. In a paper published on December 24th, 1898, in the *Comptes Rendus des Séances de la Société de Biologie*, he says: "This trypanosome presents all the characters of the genus; general shape, a homogeneous colourless membrane, one border of which is thinner, hyaline, and presents characteristic undulatory movements. This membrane bears a nucleus, and a slender flagellum which is placed anteriorly, and the undulations of which follow in rapid sucession." Nepveu describes division forms with two flagella at one of their extremities, and correctly considers them to represent a developmental stage of the trypanosome. "In conclusion," he says, "trypanosomes must be classed amongst the parasites of human blood."

On May 10th, 1901, at Bathurst, Gambia, Mr. R. M. Forde, while examining the blood of a patient suffering from an anomalous form of fever, discovered some small worm-like, actively-moving bodies, the nature of which he was unable to ascertain. The patient, master of a Government steamer on the Gambia, went home on sick leave, and on August 12th entered the Royal Southern Hospital, Liverpool, where he suffered from "three short periods of pyrexia," and other symptoms. Here Dr. J. Everett Dutton examined his blood for malarial parasites on two occasions, with negative results. Having considerably improved, the patient returned to Bathurst in the early part of December, 1901. At about the same time, Dr. Dutton also arrived at Bathurst, and Mr. Forde asked him to examine the blood of the patient once more, because he was sure it contained some extremely active worm-like bodies, which might prove of great pathological interest. On doing so, Dr. Dutton, who had previously found nothing in the patient's blood, now succeeded in detecting the parasite, recognised it to be a trypanosome, and named it *Trypanosoma gambiense*.

To Mr. Forde we are indebted not only for the discovery of trypanosomes in Gambia, but also for the first description of the symptoms peculiar to the early stage of trypanosoma infection.

The description of the parasite and the clinical symptoms of Forde's patient were published first by Dr. Dutton in the Thompson-Yates Laboratory Reports, and later by Forde himself in the JOURNAL OF TROPICAL MEDICINE.

On October 3rd, 1902, Sir Patrick Manson examined a lady, the wife of a missionary who had just returned from Monsambe on the Upper Congo. Struck by the fact that the symptoms presented by this patient (daily recurring fever, enlarged spleen, patchy œdema, erythema multiforme) closely resembled those he had noticed two months previously in Forde's case, he made a provisional diagnosis of trypanosoma fever. Manson's diagnosis was subsequently confirmed by Dr. Daniels who, after a long search, found trypanosomes in the blood of this patient.

Other cases were soon afterwards described by Drs. Broden and Brumpt on the Congo. Meanwhile, a commission consisting of Drs. J. E. Dutton and J. H. Todd was despatched to the Gambia by the Liverpool School of Tropical Medicine, to ascertain the extension and prevalence of the disease in the colony. Drs. Dutton and Todd examined over a thousand persons in the Gambia, and found the parasite in six natives and one white man (quadroon). The history and clinical examination of the native cases revealed nothing important. In the younger cases the usual enlargement of the spleen was met with. Enlargement of the lymphatic glands was present in some, but not in others; parasites were very scanty. The disease, as it occurred in natives, was a peculiarly mild one. This absence of marked clinical features in natives corroborates Nepveu's observations, because the latter failed to recognise in his patients any symptoms characteristic of trypanosoma infection. I mention this because Professors Boyce, Ross and Sherrington considered Nepveu's statement of the non-pathogenetic nature of the parasites as a strong argument against the veracity of his observations.

Drs. Dutton and Todd examined various animals in Gambia, to ascertain whether any were infected by trypanosomes, but this parasite was found only in horses. Out of thirty-six horses examined ten were infected. The symptoms noticed were loss of vigour, periodical rises of temperature, marked emaciation, and, at times, a slight watery discharge from the eyes. The diseased animal wore an apathetic, chronically-tired expression which was most characteristic. In none of these horses did they observe the marked œdemas and the changes in the coat described as characteristic of nagana. There was a general enlargement of all the lymphatic glands.

No morphological distinction could be made between *Trypanosoma gambiense* and the horse trypanosome. Therefore, it was impossible to decide whether the parasites found originally in the horse and man were the same or different. Several experiments of inoculation into lower animals were made with both parasites. These experiments seemed to indicate a marked distinction between *Trypanosoma gambiense* and the horse parasite.

As soon as Castellani discovered a trypanosome in the blood and cerebro-spinal fluid of patients suffering from sleeping sickness, the idea of a fly as the carrier of the infection came very naturally to all those who had any knowledge of trypanosoma diseases.

The first to publish any definite opinion on the matter were Dr. Brumpt and myself. It would be idle to discuss priority in the matter. I expressed my views in a lecture on sleeping sickness, delivered

at the Livingstone College, and subsequently published in the JOURNAL OF TROPICAL MEDICINE of July 1st, 1903. Dr. Brumpt's observations were published on July 2nd. However, the idea came to both simultaneously and independently the day we learned that a trypanosome was possibly the cause of sleeping sickness.

Dr. Brumpt incriminated *Glossina morsitans;* I suggested a West African species, and more especially the widely-distributed *Glossina palpalis;* but I attach no great importance to this, because Brumpt was in the wilds of the Congo, and therefore unable to identify his specimens. Besides, various species of the genus *Glossina* may be capable of transmitting sleeping sickness, just as various species of the genus *Anopheles* are able to disseminate sub-tertian fever. Our respective communications did not merely suggest the possibility of a Glossina as the carrier of sleeping sickness, because a trypanosome has been described in connection with sleeping sickness, and because nagana was known to be disseminated by a Glossina; but inversely, they were intended to support Castellani's discovery by a number of facts gleaned from a careful study of the distribution and life-history of tsetse-flies, as well as of the distribution and epidemiology of sleeping sickness.

At first, Castellani's discovery met with little favour in this country. At the last meeting of the British Medical Association, in Swansea, when the subject of trypanosomiasis was thoroughly discussed, I was the only one to uphold a casual relationship between Castellani's trypanosome and sleeping sickness. My opinion was based on the many analogies between sleeping sickness and the various trypanosoma diseases of cattle in their symptoms, course and anatomical features; and more especially on the striking connections which exist between the peculiar distribution of sleeping sickness and that of tsetse-flies, between the epidemiology of the disease and the bionomics of the Glossinæ.

I stated quite clearly that I could see no morphological difference between Castellani's trypanosome and *Trypanosoma gambiense.* I pointed out that the so-called anterior extremity of trypanosomes is really their posterior extremity, and that the true anterior extremity is the one which encloses the micro-nucleus, and from which arises the flagellum. The most cursory examination of the various flagellates, and more especially of the free-living forms, suffices to prove that the tapering end of the trypanosome continued by the free extremity of the flagellum is the posterior extremity. Authors have called it "anterior," because the parasite moves more frequently and more rapidly with this extremity foremost; but the mode of progression is not a sound argument, otherwise we should have to term "posterior extremity" the well-defined head of cephalopods, because these animals are capable of a very rapid backward motion, and in this way they usually escape the animals that prey upon them.

I also expressed the opinion that the Glossinæ do not merely transfer the trypanosomes in a passive way, as suggested by Lieut.-Col. Bruce, but that somehow they play the part of alternative hosts in their propagation.

Considering the very remarkable mode of development which obtains in tsetse-flies, I further suggested as a working hypothesis, that both nagana and sleeping sickness might be transmitted, not directly by the fly that sucks the blood of infected animals, but by its progeny, as is known to be the case in the transmission of red-water fever by the cattle tick, *Rhipicephalus annulatus,* and in the transmission of the malignant jaundice of dogs by another tick, *Hæmaphysalis Leachi.*

In August, the Royal Society published a "Progress Report," by Lieut.-Colonel David Bruce and Dr. David Nabarro. These two gentlemen fully confirmed Dr. Castellani's discovery. They stated that whilst Dr. Castellani had found the trypanosome in 70 per cent. of cases, they found it almost in every case of the disease, even in the early stages; and not only in Uganda, but also in other districts affected by the sickness.

Castellani had already observed that trypanosomes were not present in the cerebro-spinal fluid of natives suffering from other diseases, but free from sleeping sickness. Bruce examined fifteen more cases, and proved the statement correct. Dr. Wiggins also examined seven natives free from sleeping sickness in Kissumu, and likewise failed to find trypanosomes.

Castellani had found the trypanosome also in the blood of one of his cases of sleeping sickness. Bruce and Nabarro asserted that the presence of trypanosomes in the blood could be demonstrated almost in every case of sleeping sickness.

As cases of "trypanosoma fever" had been described by Drs. Baker and Moffat in Uganda, Bruce and Nabarro considered the question of a possible connection between the two conditions. However, they did not venture any definite opinion, but merely described certain morphological differences which, they thought, seemed to separate Castellani's trypanosome from *Trypanosoma gambiense.* They stated that the flagellate found in sleeping sickness was shorter, had chromatic dots more frequently, and the micro-nucleus was situated nearer the extremity than in *Trypanosoma gambiense.*

Numerous experiments were carried out in monkeys, dogs, rats, and other animals, both with trypanosomes from sleeping sickness cases and from trypanosoma fever. Both sets of experiments gave positive results, but did not lead to any definite conclusion.

From the analogy suggested by nagana, Bruce and Nabarro suspected that a tsetse-fly might be the carrier of the disease. Two species of Glossina were obtained from the Botanical Gardens at Entebbe, and experiments at once commenced. One monkey, after having been bitten on successive days by 215 tsetse-flies, showed trypanosomes in its blood fourteen days after the first day of experiment.

In November appeared a "Further Report" by Lieut.-Colonel Bruce, Dr. Nabarro, and Captain Greig. In this report the Commissioners stated that they were inclined to consider trypanosoma fever as the first stage of sleeping sickness. They described two cases of trypanosoma fever which, after a short period of improvement, developed symptoms suggestive of sleeping sickness. At the same time, the parasites, which had been confined to the blood, appeared in the cerebro-spinal fluid.

In this second report the Commissioners retracted their previous statement concerning the morphological differences between *Trypanosoma Castellani* and *Trypanosoma gambiense*. They stated that the differences mentioned in the "Progress Report" have no specific importance, but only show that the parasites find the cerebro-spinal fluid not so favourable for this growth as the blood. Trypanosomes from the cerebro-spinal fluid injected into the blood of monkeys became quite as long as the trypanosomes found in the blood of man.

Numerous experiments are described in monkeys, dogs, guinea-pigs, donkeys, oxen, sheep and goats. The experiments were carried out with trypanosomes taken both from cases of sleeping sickness and trypanosoma fever. The inoculations were performed into the brain, into the vertebral canal, or subcutaneously. The monkeys showed the greatest susceptibility, and exhibited symptoms resembling those of sleeping sickness, no matter whether inoculated with the cerebrospinal fluid of sleeping sickness cases or the blood of trypanosoma fever cases. Rats and dogs were only partially susceptible; oxen, donkeys, goats, sheep and guinea-pigs were absolutely refractory. These experiments tended to prove the identity of the trypanosomes found in sleeping sickness and trypanosoma fever.

Other experiments were made to determine whether the Uganda tsetse-flies are able to convey sleeping sickness.

Five monkeys were submitted to the bites of tsetse-flies. The flies were collected in the neighbourhood of Entebbe; they were fed on patients suffering from sleeping sickness, and after eight, twenty-four, or forty-eight hours they were made to bite the monkeys. Hundreds of flies were used in each experiment, and the monkeys were bitten every day by ten, thirty, sixty or a hundred and forty flies until a positive result was obtained. After a period of about two months trypanosomes invariably appeared in the blood of the experimental animals.

A second set of experiments with tsetse-flies and monkeys was also carried out to ascertain whether flies freshly caught in the vicinity of Entebbe were actually carrying the trypanosomes of sleeping sickness.

Three monkeys were submitted to the bite of large numbers of flies caught in the vicinity of the hut-tax labourer's camp in Entebbe. All three monkeys showed trypanosomes in their blood after a period of from two to three weeks.

The experiments made by the Commissioners with tsetse-flies collected at Entebbe, and fed on monkeys after being fed on cases of sleeping sickness, have been almost unanimously accepted as proving: (1) That the trypanosomes of sleeping sickness are transmitted from the sick to the healthy by *Glossina palpalis*. (2) That the fly carries the parasites much in the same way "as the vaccinating needle carries the infection of vaccinia from child to child."

I do not doubt in the least that *Glossina palpalis* is the carrier, or at least a carrier, of sleeping sickness; indeed, I was the first to suggest it; but, to my mind, the experiments made by Lieut.-Colonel Bruce and his colleagues do not prove the point in any way. In the first place, I do not consider it as proved that the fly carries the infection in the same way as a vaccinating needle carries the infection of vaccinia. The experiments made by Bruce on nagana with tsetse-flies (*Glossina palipides* and possibly *Glossina morsitans*), those made by Rogers on surra with Tabinidæ (*Tabanus tropicus*, *Tabanus lincola*), those made by Theiler on "gall sickness" with Hippoboscidæ (*Hippobosca rufipes*, *Hippobosca maculata*) prove, perhaps (though I am inclined to explain them in a very different way), that a fly disturbed while sucking a trypanosoma-infected animal *may* convey the disease to a healthy animal by means of its blood-soiled proboscis, just as malaria may be conveyed by a needle soiled with malaria-infected blood. But this mode of transmission does not seem to be the usual one. It does not explain why nagana is carried exclusively by a Glossina, and not by any of the many other blood-sucking animals which attack horses and cattle outside the tsetse stations, or "fly-belts" as they are called. It does not explain why sleeping sickness is likewise strictly confined to the tsetse tracts, and is not propagated by the numerous blood-sucking insects and Acarida which swarm in the huts of the natives or cover their bodies.

But there are many other objections against the Commissioners' experiments at Entebbe. These gentlemen did not rear their flies for one or more generations in the laboratory, as should have been done, in conformity with the numerous and masterly experiments which have been carried out in connection with the intermittent fevers of man and the hæmoglobinuric fevers of cattle. They collected their flies at random, and we know for certain that many of these flies were already infected with trypanosomes, because, in the second set of experiments, they infected the monkeys they were made to bite soon after being caught, and without being previously fed on cases of sleeping sickness. That the trypanosomes they inoculated were those of sleeping sickness is far from certain. The Commissioners state themselves that they examined some oxen in Entebbe, and found in the blood of these animals a trypanosome which was neither *Trypanosoma Brucei* nor *Trypanosoma gambiense*. And surely many other species of trypanosomes are to be found in the blood of the mammals, the birds, the batracians, and the fish of Uganda. The Commissioners are silent on this point. Some of the monkeys used for the experiments belonged to an Asiatic species (*Macacus rhesus*), and were purchased in England. The majority, however, were specimens of a local Cercopithecus. The Commissioners do not tell us whether any of the Uganda monkeys presented trypanosomes in their blood, or whether there was any sickness amongst these animals, under natural conditions. A careful examination of the local monkeys would have been very important. The Lokoja natives, knowing nothing of trypanosomes, assert that the tsetse extracts from a certain small red monkey the poison with which it inoculates the bush-cow or dwarf buffalo.

All the monkeys used for the experiments were kept in the open without any protection from blood-sucking Diptera or any other source of infection.

The most striking fact in the experiments made by Bruce and his collaborators is, that whilst the monkeys

bitten by flies not fed first on cases of sleeping sickness, presented trypanosomes in their blood within *two or three weeks*, those bitten by flies fed previously on sleeping sickness patients did not show any trypanosomes in their blood until about *eight weeks after* the commencement of the experiment. This singular fact clearly proves that the flies, instead of drawing trypanosomes from the blood of the sleeping sickness patients, who probably had very few, if any, in their peripheral circulation, actually discharged in the blood of the latter all, or most, of the parasites they were still harbouring.

The three experiments in which flies were fed on monkeys directly after being caught, may be looked upon as controls to the other experiments in which the flies were supposed to have been artificially infected by previous feeding on cases of sleeping sickness. They negative most forcibly the conclusion arrived at by the Commissioners, that their experiments prove: "That *Glossina palpalis* can convey trypanosomes from sleeping sickness cases to healthy monkeys, up to at least forty-eight hours after feeding."

All these experiments will have to be repeated in a thoroughly scientific way. Meanwhile, I believe that the bond of association between the trypanosome of sleeping sickness and *Glossina palpalis* is far more intimate than Bruce suspects.

At the same time as the "Further Report" by Bruce, Nabarro and Greig, though received long before, the Royal Society published several other reports by the members of the first Commission. One of these reports, by Drs. Low and Castellani, is devoted to the clinical aspects of sleeping sickness. The symptoms of the disease and its morbid anatomy, both macroscopical and microscopical, are fully and admirably described. There is one point, however, on which I cannot agree with the authors. They state that polyadenitis is a common condition amongst natives, and cannot, therefore, be regarded as a special symptom of sleeping sickness. They say that it is difficult to determine what produces this polyadenitis, but that perhaps frequent skin diseases, syphilis, and verminous invasions may be responsible. Fully admitting that syphilis and other diseases may be in Africa, as elsewhere, a fruitful cause of glandular enlargements, I believe, nevertheless, that the glandular swellings met with in natives suffering from sleeping sickness, or living within the affected areas, are decidedly symptomatic of the trypanosome infection. An analogous polyadenitis is met with in surra, in nagana, in dourine, in mal de Cadaras, although it may be more or less marked in various kinds of animals. Kanthack, Durham, and Blanford, as well as Plimmer and Bradford, have laid special stress on the hypertrophy of the lymph glands in nagana, and especially about the region of inoculation. They have also shown that the swollen glands contain the parasites. Indeed, the trypanosomes are present in the glands from one to three days before they are discoverable in the blood, and they may be very abundant in the glands when still scanty in the blood. From time immemorial this enlargement of the glands has been considered a premonitory sign of sleeping sickness by the natives of various parts of Africa affected by the disease. Winterbottom tells us that slave-traders considered these swollen glands as a symptom of sleeping sickness. "They either never buy such slaves, or get quit of them as soon as they observe any such appearances." Dr. McCarthy, Surgeon-Major Gore, and Dr. Corre report that the natives of Senegambia believe that sleeping sickness may be cured by a timely cauterisation or extirpation of the swollen glands. Dr. Christy discovered that the area of distribution of enlarged cervical glands in Equatorial East Africa agrees with that of sleeping sickness.

My rapid survey of the work which has unravelled the mysteries of sleeping sickness would be incomplete if I did not mention Mr. E. Austin's admirable monograph of the tsetse-flies. Mr. Austin's book, with its careful description of the various species, with its copious information on the bionomics of these flies, with Mr. Terzi's splendid illustrations, will certainly prove of invaluable aid in future researches.

The last step in the history of sleeping sickness is one of great importance. The lady patient examined by Sir Patrick Manson on October 3rd, 1902, and so sagaciously diagnosed as a case of trypanosoma fever, began to show symptoms of sleeping sickness about two months ago, and died of the disease on November 26th, 1903—two years and three months after the presumed date of infection. At the autopsy, and subsequent microscopical examination of the brain, Drs. Mott and Low found unequivocal evidence of sleeping sickness. The history of this case proves beyond doubt that Europeans are liable to sleeping sickness; that the disease is a trypanosoma infection; and that the so-called "trypanosoma fever" is only a precursory stage of "sleeping sickness." The trypanosomes from this case, in its early stage, were the very ones I had compared with those found by Castellani in sleeping sickness cases and declared morphologically identical.

Lately there has arisen some disagreement on questions of priority concerning the discovery of trypanosoma in sleeping sickness, and the suggestions of the part played by tsetse-flies in the propagation of the disease. I have endeavoured to adhere very scrupulously to the exact facts, so as to avoid any quarrel. I hope, therefore, that the discussion will not lapse into a worthless controversy, but that it will lead to useful suggestions for the prevention of the deadly African scourge.

Gentlemen, a great scientific triumph has been achieved; let us bestir ourselves to do justice and honour to those who, heedless of danger, have wrought this noble work.

(Discussion to be continued.)

Oatmeal in Diabetes.—Noorden, van (*Berliner klinische Wochenschrift*), recommends a diet of oatmeal porridge as a means of lessening the sugar in diabetes of long standing. The porridge should be made with 5½ oz. of oatmeal, 3 oz. butter, and 3 oz. white of egg. This quantity is sufficient for twenty-four hours' food and should be given every two hours. Along with the diet of porridge van Noorden allows wine, brandy and coffee to be taken.

THE EFFECTS OF THE ANTI-MALARIAL CAMPAIGN AT ISMAILIA.

Statement by Professor Boyce, F.R.S.

On February 22nd, Sir Alfred Jones, K.C.M.G., entertained at luncheon, at the Liverpool Exchange Station Hotel, a number of guests directly interested in the health of the Colonies. The luncheon was held for the purpose of meeting Professor Boyce and hearing his report on the anti-malarial campaign in Ismailia. Sir Alfred Jones stated the object of the meeting.

Professor Boyce said that the result of the programme drawn up by Professor Ross in 1902 had been attended with highly encouraging and beneficial results. The authorities at Ismailia had loyally carried out everything Professor Ross had suggested, and as a result of spending £4,400 had put their town in order. At the same time they organised two brigades, one the petroleum and the other the drainage, each of which had carried out measures which had proved most effective, inasmuch as that they could now sleep in any of the houses in the European quarter without mosquito nets. As to the actual reduction in malaria cases in Ismailia itself, he pointed out, that whereas the average used to be something like 2,000 a year, it had been reduced in 1903, according to the latest statistics drawn up by an independent medical officer, to 200. He might put it in this way, that there were no fresh cases of malarial infection in Ismailia, whilst there had been no deaths amongst Europeans during the past year, and only four amongst the natives, as against thirty deaths in the previous year. There was no doubt that when the authorities and the inhabitants made up their minds to get rid of malaria they could do so. He looked upon that experiment in Egypt as having done more to impress the world with the use of scientific co-ordinating measures than anything else. The time had come when we must expand our medicine and teach our students medicine applicable to the whole world. That was really what the Tropical School meant; it was not the speciality of any school, it should be the medical teaching of our schools generally.

Professor Ronald Ross said results of the work at Ismailia had demonstrated two things—first, that it was possible to rid a town of mosquitoes, and secondly, that it was equally possible to eradicate malaria. Five years ago he advocated measures similar to those carried out at Ismailia to be carried out at Sierra Leone, and something had been done on the lines suggested, but not a great deal. They could now go to all the authorities in their tropical colonies and, pointing to the results at Ismailia, ask them to take up the work in their own region—they could now have no excuse for further delay. They had led in the discovery; but America and France led now in the application. They would now go to the Government with this report, and ask that action be taken in all tropical colonies. He should send copies to India, where 300,000 cases of malaria occurred amongst the troops and the prisoners in gaols. Mr. Brodrick had asked him to draw up a report of the matter, and now that these figures were available he would use them.

Business Notices.

1.—The address of the Journal of Tropical Medicine is Messrs. Bale, Sons & Danielsson, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editors.**

3.—All **business communications** and **payments**, either for subscriptions or advertisements, should be sent **to the Publishers,** of the Journal of Tropical Medicine. Cheques to be crossed The Union of London, Ltd.

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Contributors of Original Articles are entitled to six copies of the Journal. If reprints are required they will be supplied by the publishers, if the order is given with remittance when sending the MS. The price will be as below:—

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THE

Journal of Tropical Medicine

March 1, 1904.

A DIPLOMA IN TROPICAL MEDICINE.

For some time past the authorities of the University of Cambridge have had under consideration the establishment of an examination and the granting of a diploma for proficiency in Tropical Medicine. On November 4th, 1903, the Special Board for Medicine presented a report on the subject, which was considered by the Senate of the University.

The result of the deliberations has culminated in the issue of definite rules and regulations for the conduction of the examination; the first of which is to be held on August 9th, 1904.

The examination in Tropical Medicine and Hygiene is to be conducted by the State Medicine Syndicate of the University of Cambridge, and candidates for examination are admissible under certain conditions.

Regulations for the Examination in Tropical Medicine and Hygiene, issued by the University of Cambridge.

"An examination in Tropical Medicine and Hygiene will be held in Cambridge during the year 1904. The examination will begin on August 9th, and extend over three days.

"Any person whose name is on the *Medical Register* is admissible as a candidate to this examination, provided

"(1) That a period of not less than twelve months have elapsed between his attainment of a registrable qualification and his admission to the examination;

"(2) That he produces evidence, satisfactory to the Syndicate, that he has diligently studied pathology (including parasitology and bacteriology) in relation to tropical disease, clinical medicine and surgery at a hospital for tropical diseases, and hygiene and methods of sanitation applicable to tropical climates.

"*** As evidence of study and attainments a candidate may present to the Syndicate (1) any dissertation, memoir, or other record of work carried out by himself on a subject connected with tropical medicine or hygiene; (2) any certificate or diploma in public health or sanitary science he may have obtained from a recognised examining body. Such evidence will be considered by the Syndicate in determining whether he is qualified for admission to the examination, and by the examiners in determining if admitted, he shall be included in the list of successful candidates.

"The examination will have reference to the nature, incidence, prevention, and treatment of the epidemic and other diseases prevalent in tropical countries. It will comprise the following subjects:—

"(1) The methods of pathological and bacteriological investigation; the examination of the blood; the characters, diagnosis, and life-history of animal and vegetable parasites; the examination, chemical and microscopic, of poisonous or contaminated foods and waters.

"(2) The origin, pathology, propagation, distribution, prevention, symptoms, diagnosis, and treatment of the epidemic, endemic, and other diseases of tropical climates, including malaria, blackwater fever, trypanosomiasis, relapsing fever, dengue, yellow fever, plague, tetanus, beri-beri, dysentery and hepatic abscess, cholera, enteric fever, Malta fever, and specific diarrhœal affections of the Tropics, diseases due to cestode and other worms, filariasis, bilharzial disease, specific boils, sores, and other cutaneous affections, mycetoma, ophthalmic affections of the Tropics, affections caused by poisonous plants and animals, and by poisoned weapons and sunstroke.

"(3) The general effects on health in the Tropics of seasons and climate, soil, water, and food. Personal hygiene, acclimatisation; principles of general hygiene, with special reference to food and water supplies, sites, dwellings, drainage, and the disposal of refuse; the sanitation of native quarters, camps, plantations, factories, hospitals, asylums, gaols, pilgrim and coolie ships; principles and methods of disinfection.

"The examination will be partly in writing, partly oral, and partly practical and clinical. The clinical part will be conducted at a hospital for tropical diseases, at which cases will be submitted for diagnosis and comment.

"Every candidate will be required to pay a fee of six guineas before admission or readmission to the examination. A candidate who after being approved for admission fails to present himself at the examination will not have the fee returned, but will be entitled to present himself without further fee on one subsequent occasion.

"Every candidate who passes the examination to the satisfaction of the examiners will receive from the University a diploma testifying to his knowledge and skill in tropical medicine and hygiene.

"All applications for information respecting the examination should be addressed to Mr. G. H. F. Nuttall, Pathological Laboratory, Cambridge.

"Candidates who desire to present themselves for the examination must send in their applications on forms supplied for the purpose, and transmit them, together with the required evidence of study, and the fee of six guineas, to The Registrary of the University, Cambridge, not later than July 22nd. Cheques should be crossed 'Barclay and Co., Ltd.'"

The Examiners for the University Diploma in Tropical Medicine are Dr. G. H. F. Nuttall, University Lecturer in Preventive Medicine, Sir Patrick Manson, K.C.M.G., F.R.S., and Professor Ronald Ross, C.B., F.R.S.

THE BRINE BATHS OF DROITWICH.

In this issue of the Journal will be found an advertisement of the Droitwich Brine Baths. The efficacy of brine baths is gradually gaining favour with the medical profession and with the public, and the repute of the Worcestershire spa is slowly, it may be, but surely, increasing. There is no doubt about the water supplied at the baths being of the quality claimed

MAJOR RONALD ROSS, C.B., F.R.S.

Bale and Danielsson, Ltd., London.

for it. Anyone who has visited the spa and bathed either in the swimming baths or in the private baths knows, without elaborate chemical analysis, that the water contains salt in quantity. The salt taste, the buoyancy of the water, and the fine powder of salt left on the skin after bathing are sufficient testimony of the genuineness of the spa water. Immersion in warm brine water must have a decided effect, be it due to the mere action on the skin, or, what is more likely, by the osmotic action consequent upon immersing the body in a fluid of a high specific gravity. A more potent agent it is scarcely possible to conceive and the direct therapeutic action must be considerable. For tropical residents at home on leave or holiday, the Worcestershire spa has much to recommend it. The tropical resident with the organs of the body overloaded with deleterious matters consequent upon deficient exercise and a surplus of food, with a habit of body akin to, or actually threatening, gout, the brine baths of Droitwich are likely to prove of the utmost benefit, and they are becoming widely known for their beneficial action in such cases.

The hotels in Droitwich are excellent, and the best of them have been specially built for the accommodation of persons requiring treatment; and they have been planned and constructed under the immediate supervision of medical men, who have not hesitated to hold themselves responsible for their suitability and adaptability to patients frequenting the spa. It is the fashion in Britain to send persons requiring balneological treatment to continental spas, but British folk who have lived abroad do not care to spend part of their short stay "at home" on the Continent; they would prefer, if possible, to have their "bath" or "spa" treatment, if such is necessary, in their native land, where they can breathe their native air and have home surroundings. In Droitwich they will find both in winter and summer congenial surroundings in the very heart of England.

MAJOR RONALD ROSS, C.B., F.R.S.

The portrait of the distinguished man we present with this issue of the Journal will be welcomed in all parts of the world. In the Journal of January 1st, 1903, we gave an outline of the career of Major Ross, and we beg to refer our readers to that issue for fuller details. The son of General Sir C. C. G. Ross, Ronald Ross entered as a student at St. Bartholomew's Hospital, London, and subsequently joined the Indian Medical Service in 1881. His ever memorable work in establishing the mosquito-malarial theory has made his name a household word throughout the world. When Major Ross returned to England he devoted his energies to establishing the Liverpool School of Tropical Medicine, and the success of that undertaking is now well assured.

In 1901, Major Ross was elected a Fellow of the Royal Society; in 1902 he was appointed a Companion of the Most Honourable Order of the Bath, and in the same year he gained the Nobel Prize.

Major Ross has, we hope, a long period of active work before him, so that he may continue to add to the increase of knowledge in the future as his discoveries have so markedly done in the past.

LONDON SCHOOL OF TROPICAL MEDICINE.

Craggs's Research Prize.

The Craggs's Research Prize of £50 will be awarded to a past or present student of the London School of Tropical Medicine who makes the most valuable contribution to Tropical Medicine. The papers must be written in English, and essays must be sent in, on or before October 1st, 1904, to the Medical Tutor at the School, Royal Albert Dock, London, E.

Colonial Medical Service.

Davis.—Dr. L. F. Davis has resigned the office of District Commissioner of Orange Walk, British Honduras, as well as that of an Assistant Colonial Surgeon.

Godfrey.—Dr. J. E. Godfrey, Medical Inspector of British Guiana, having returned to the colony from leave of absence, has taken over the duties of Surgeon-General from Dr. J. Widdup, who acted when Sir David Ross went on sick leave.

Hodgetts.—Dr. C. A. Hodgetts succeeds Dr. P. H. Bryce, who has been transferred to the service of the Dominion of Canada as Secretary of the Provincial Board of Health of Ontario.

Ross.—Sir David Palmer Ross has left British Guiana for Barbadoes, where he will remain until the expiration of his leave at the end of March. He intends retiring in August, after thirty-eight years' colonial service.

Reviews.

"The Calcutta Practitioner": A New Medical Journal.

The first issue of *The Calcutta Practitioner*, dated January, 1904, is to hand. The names of the Editors do not appear, but in the introduction it is stated that the object of the journal "is to have a medium of circulation of the records of the valuable experience of the isolated units of the medical profession in Bengal." Further, it is represented as "a reproach that there is not more than one such organ of the medical profession in the first city of India."

The articles in the Journal for January, 1904, are "Adrenalin Chloride," by Dr. K. C. Bose, and "The Bhowanipore Food Poisoning Case," by Dr. C. Bose. Clinical Records, Current Literature, Reviews of Books, &c., complete the January number. The Journal is issued in pamphlet form, it extends to 32 pages, and is well printed. As a clinical journal *The Calcutta Practitioner* should play a useful part, and

will, no doubt, have immediate and encouraging support throughout not only Bengal but elsewhere in India.

Hygiene des Colons, Hygiene Coloniale. By Gustave Reyaud, Professor of Hygiene in the "Institut Coloniale de Marseille," with a Preface by M. A. Kermorgant. Illustrated: 7 photogravures and 52 figures in the text. Paris: J. B. Baillière et Fils, 1903.

The author devotes the first chapter to the question of the physical qualities required of persons intending to reside in a warm climate. The varieties of dwellings met with in different countries are extensively considered, the means and adjuncts of ventilation, and of the disposal of house sewage are described in Chapter II. Food is discussed in the third and fourth chapters; dress and the hygiene of the skin are dealt with in the fifth. Chapter VI. deals with exercise, the prophylaxis of malaria, and the precautions to be taken during expeditions, whether for exploration or for military purposes. The last chapter in the book is devoted to "first aid" in cases of illness and accident.

This is a handy book, readily understandable by the public, and written in a style which shows the author to be familiar with, and quite master of, his subject.

Food for the Tropics: being a Short Description of Native Produce Suitable for Food in Tropical Countries. By T. M. Macknight. London, Calcutta and Bombay: W. Thacker and Co., 1904. Pp. 116.

Mr. Macknight has given us an interesting and useful book, for it is devoted to an enumeration and an account of foods and fruits, &c., in use by natives of tropical countries. The author states "that the indigenous products of a tropical country are more suitable as food for the inhabitants than any which can be imported from another country having a totally different climate." In this opinion we quite agree, and it might be well were Europeans to bear this in mind, and to recognise the fact that the food of the native of any country is that best suited to meet the contingencies of climate in that particular part of the world. To enumerate the separate items in the book in a short review is an impossibility, but Mr. Macknight has simplified the task by classifying the food and fruits under their several affinities. Under the heading Bread, the author mentions bread fruit, bulrush millet, guinea corn, maize, manioc, plantain, ragi, rice and sago. Of these manioc, maize and the various millets come nearest in the value of their proteids to bread made from wheaten flour. Potato-like foods are the cassava, sweet potato, taro and the yam. Chapter IV. is devoted to "meat," and here the author includes as "meat" not only the flesh of animals, but any substance which, on chemical analysis, show a high proportion of proteids. Several beans, peas and grains are included amongst the meats for this reason, although the wisdom of the grouping may be questioned. "Butter" is dealt with in Chapter V., and includes oils and fats similar in chemical constituents to butter made from the cream of cows' milk. The most universally used is Til or Beni oil, which has the great advantage that it will keep for several years without becoming rancid either in taste or smell. A similar quality is claimed for Shea butter made from the *Butyrospermum Parkii*. Shea butter, Mungo Park states, is whiter and firmer and richer in flavour than cow's butter, and keeps a whole year without salt. Chapters on vegetable sugars, fruits, and condiments are also contained in the category of "food in the Tropics," and useful appendices giving the percentage composition of some articles of food of the temperate and tropical zones, a bibliography, and the names of some of the best edible fishes of the Tropics and their *habitat*. Altogether this is a serviceable and interesting work, a distinct step in tropical literature, and a most useful addition to our knowledge. Every one dwelling in the Tropics will be keenly interested by Mr. Macknight's book, and will thank the author for the great pains he has devoted to its preparation.

New Drugs, &c.

Gastrodynic, a compound enzyme palatinoid, is the name given to a combination of pancreatin, pepsin and lactophosphate of lime introduced by Oppenheimer, Son and Co., Ltd., London. The drugs are specially prepared and in the treatment of dyspepsia have earned a high reputation.

The Standardisation of Disinfectants.—At the general meeting of the Jeyes' Sanitary Compounds Company, held in London on January 19th, 1904, the Chairman in the course of his remarks said: "It is a queer anomaly in English law that a butterman selling margarine as butter, a grocer mitigating the strength of his sugar with sand, can be, most properly, severely punished; while every retailer of disinfectants in the land is free to sell as trustworthy and efficient any rubbish, labelled with preposterous claims and supported by venal testimony, freely advertised, regardless of the fact that often life and death are involved. In this regard, I am glad to tell you that that most useful body the Sanitary Institute has in hand the question of inducing the Govermnent to adopt an established test regulating the sale of all disinfectants by their co-efficiency to some legal standard. The Chairman of the chemical section of that Institute, in his speech at Bradford, in July last, having expressed doubts as to the funds for the necessary scientific work and experiments being forthcoming, your Directors, while holding that it is the duty of the Government to further such a scheme, undertook to provide the funds needful sooner than allow the proposal to come to nought. I do not know yet to what extent your prospective dividends may be jeopardised by this offer, but am sure the adoption of such a standard will be beneficial to your ultimate interests as well as of great public benefit."

This public-spirited action on the part of the directors of "Jeyes" will be received everywhere with acclamation.

APOLLINARIS WATER.

THE *Lancet*, January 20th, 1904, p. 323, gives an extensive account of the Apollinaris water spring, of the water itself as it issues from the spring and as it is supplied to the public. Some months ago the Apollinaris Water Company was charged before a magistrate with selling its bottled waters with a false trade description. The accusation was held to be a false one, and on appeal the Lord Chief Justice upheld the magistrate's decision. The *Lancet* has analysed the water as it issues from the spring and as it is sold in bottles to the public, with the result that the magistrate's and the Chief Justice's findings are sustained from a chemical point of view. No one who has ever visited the Apollinaris spring in the valley of the Ahr, eastward from Remagen on the Rhine about five miles, can doubt the genuine nature of the water and the inexhaustibility of the supply. Seeing that water carriage is possible all the way from Remagen to London, it would appear to be cheaper to bottle the water as it issues from the wells than to construct manufacturing works for an artificial water in or near London. For thirty years now Apollinaris water has held the *première* place amongst table waters in Britain, and there seems no likelihood of its being displaced by any natural or artificial mineral water known in Europe. The analysis of the natural water, according to the *Lancet*, is as follows :—

Silicia	0·080	grammes per 10 litres.
Iron	0·090	,, ,, ,,
Sodium chloride ..	4·212	,, ,, ,,
Sodium carbonate ..	12·213	,, ,, ,,
Sodium sulphate ..	2·800	,, ,, ,,
Calcium carbonate ..	2·450	,, ,, ,,
Magnesium carbonate..	4·875	,, ,, ,,
Total saline constituents	26·720	,, ,, ,,

The water as it issues from the spring is absolutely sterile ; the quantities of free ammonia 0·0224 grains per gallon, and of albuminoid ammonia 0·0028, showing an excellent sanitary state of the water. The satisfactory reports regarding Apollinaris water as to its purity and genuine character must tend to increase its consumption in hot countries, in many of which the artificially produced table waters, except in a few first-class manufactories, are not above suspicion.

Notes and News.

BENGAL—MUNICIPAL INCOMPETENCY.—The native municipal authorities of Nadia in Bengal have been dismissed from office owing to inability to control the sanitation of the town. The death-rate in the town during 1902 amounted to 42·55 per 1,000 of the inhabitants. The cause of this mortality is the usual one, namely, pollution of drinking water by contamination with excreta. As Nadia is built upon a sandy soil the "well privies," as they are called, merely hollows scooped in the ground, are calculated to infect the adjacent wells. As Nadia is a place of pilgrimage it is necessary for the public safety to have the sanitation of the place under systematic control.

THE DISINFECTION OF STOOLS.—The following compound, according to the *Revue Française de Medecine et de Chirurgie*, 1904, January 11th, effectually masks the unpleasant odour of stools and urine : A teaspoonful —about 75 grains—of the following mixture is recommended to be put into the commode :—

℞.	Zinc. sulp.	℥iii.
	Acid. sulp.	℥ii.
	Ol. mirbane	min. $\frac{1}{3}$.
	Indigo	gr. $\frac{1}{6}$.

The indigo colouring is merely a means of preventing errors.

MOSQUITO NETS ON BOARD STEAMERS.—The provision of mosquito nets for use on board steamers engaged in the West Africa trade is under the consideration of the Liverpool Chamber of Commerce.

CONTRASTS IN CLIMATE WITHIN THE BRITISH EMPIRE. —*Symons's Meteorological Magazine* summarises the range of temperature, rainfall, humidity, &c., during twelve months at the principal British stations all over the world. If the largest possible amount of cloud were reckoned as the figure 10, then London's share is estimated at the figure 6·6. Grenada was the station which had least, with its cloud represented by the figure 2·9 ; and Grenada was also the place where there was the least range of temperature in the year. There was a difference of only 22·4° F. between its highest and lowest temperature. Winnipeg had the greatest difference, of 127·3° between its coldest and hottest; it also had the lowest temperature, of 36° below freezing—which was, however, comparatively high. Winnipeg retained its record of being the coldest station in the empire throughout the year, with a mean temperature of only 37·6°. Madras was at the other end of the scale, with a mean temperature of 83·2° ; but Adelaide, besides being the driest station, had the hottest day—with a temperature of 111·4° in the shade. The dampest station was Trinidad ; but Colombo, in Ceylon, had the greatest rainfall, of 117 in., and Coolgardie had the least rainfall, of 14·69 in. Trinidad, though it did not reach the century in the shade, showed a temperature of 177° in the sun.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis.

ZINN, W. Ueber die Wurmkrankheit Ankylostomiasis und ihre Bekämpfung. *Therapie der Gegenwort*, Berlin, vol. xliv., No. 12.—According to Zinn, 17,161 out of 181,730 miners working in Germany suffer from ankylostomiasis.

Cancer in Australia.

MULTYPTOL—A REMEDY.—Adams, G. Cooke. Cancer in Australia : a Comparison with other Colonies,

together with a Specific Treatment for the Prevention and the Arrest of the Disease. *Lancet*, 1904, February 13th and 20th.—Dr. Adams shows that cancer is much more common amongst British-born folk in Australia than amongst the Australian born; so much is this the case that in 1902, of 100,000 living, the proportion of death-rates from cancer was for British-born folk living in Australia 203·1, whereas amongst Australian-born people it amounted to only 22·6. In a table showing the proportion of death-rates from cancer amongst foreign-born inhabitants other than British, the following are the figures: Of 100,000 living, the death-rate amongst people from Germany was at the rate of 252; from France, 375; from Austria, 300; from Russia, 80; from Sweden and Norway, 289; from China, 72; from Italy, 65; and from the United States of America, 61. The figures relating to the Chinese are especially interesting. No authentic records of the extent to which the Chinese suffer from cancer have ever before been published owing to the impossibility of gaining definite knowledge on the subject. In Australia, however, the Chinese form the largest proportion of the foreign-born inhabitants, and they exist in sufficient numbers and remain long enough in the country to justify a scientific conclusion on the matter. Of 1,316 deaths of Chinese registered in Victoria, between 1894 and 1900, from all causes, 49 died of cancer. Taking the proportion of cancer deaths to 100 deaths from all causes of persons of 35 years and upwards, 5 per cent. only of Chinese died of cancer, being one-third less than the corresponding figures for French, Austrians, or Scandinavians living in Australia. It is also interesting to note that of 70 deaths amongst aboriginals in Victoria, one only was ascribed to cancer.

Dr. Adams states as the results of his investigations, that he believes syphilis to be the greatest exciting factor in the cause of malignant disease. He further states that the antidote or specific on which he relies for arrestive treatment is an Australian eucalyptus oil which for purposes of differentiation he has named "multyptol." Multyptol may be obtained from the Australian Eucalyptus Chemical Co., 19, Mansion House Chambers, Queen Victoria Street, London, E.C. Dr. Adams contends that it is impossible to grow the eucalyptus oil necessary to produce "multyptol" anywhere in the world except Australia. The oil is administered by the mouth, by inunction, by hypodermic injection, by rectal injections, or by inhalations. The dosage by the mouth is 5 minims, gradually increasing the quantity to 10 minims at the end of the second month of treatment. The cases of breast cancer quoted by Dr. Adams were in many cases advanced with glandular enlargement in the axilla, yet persistent treatment for several months brought about what seems to have been actual arrest of the disease.

Dysentery.

Vincent, H. Cas de Dysenterie Amiblene. *Presse Medicale*, Paris, 1904, vol. ii., No. 102.

Blanc, E. H. La colite muco-sanguine, ou fausse dysenterie des pays chauds et son traitement. *Semaine Medicale*, Paris, 1904, vol. xxiv., No. 1. — The treatment of muco-sanguineous colitis, or the false dysentery of the Tropics, is treated by Blanc (Shanghai) by castor oil purgation and the administration of doses of a decoction made from simaruba bark, 60 grammes, cinnamon bark 30 grammes, and 2,500 grammes of water. After the decoction has been reduced to 2,000 grammes by boiling, three tablespoonfuls of brandy are added. The decoction is taken in four parts during the twenty-four hours with a little laudanum if the stools are bloody. Castor oil is taken occasionally if constipation continues for thirty-six hours. During the first day of treatment no food is given until the evening, when a soft-boiled egg or chicken broth is allowed. Afterwards the diet consists of soft-boiled eggs, chicken broth, toast, and boiled fowl. Occasional enemata of 10 grammes each of bismuth subnitrate and salicylate with 1 gramme of tragacanth in 500 grammes of water filtered through muslin are given every second or third day.

Malaria.

McKibben, W. W. Malaria and Mosquitoes of Worcester, U.S.A.: a Year's Observations on the Habits of *Culex* and *Anopheles*. *Boston Medical and Surgical Journal*, 1903, December 17th and 24th.

Plague.

Prevalence of the Disease.

India.—During the weeks ending January 16th and 23rd, the deaths from plague in India numbered 21,302 and 21,103 respectively. During the corresponding weeks in 1903 the deaths from the disease were some 2,000 higher.

Hong Kong.—Two cases of plague and 2 deaths from the disease were reported during the week ending February 13th.

China.—Plague cases were reported in Niu-Chwang in December. At Tien-tsin 2 deaths from plague occurred during December, 1903.

Japan.—No plague existed in Yokohama on January 1st, 1904. In Formosa, during September and October, 1903, there were 7 cases and 6 deaths from the disease.

Mauritius.—The fresh cases of plague reported during the weeks ending February 11th and 18th numbered 4 and 1; deaths from plague, 1 and 1.

Cape Colony.—Two cases of plague and 2 deaths from the disease occurred at Port Elizabeth during the week ending January 16th.

Brazil.—During November, 83, and during December, 57 persons died of plague in Rio-de-Janeiro. At Pernambuco, between September 6th and December 22nd, 29 cases of plague and 12 deaths from the disease were reported.

Peru.—Plague is stated to have reappeared at Lima.

Argentine.—At Tucuman 120 cases of plague had occurred up to December 25th.

United States of America.—During 1903, 17 cases of plague occurred in San Francisco, against 41 during 1902.

Trypanosomiasis.

Leading Article. *Boston Medical and Surgical Journal*, 1904. January 28th.

Yellow Fever.

CARROLL, JAMES. A Brief Review of the Etiology of Yellow Fever. *New York Med. Journ.*, 1904, February 6th, p. 244.—Carroll, who was one of the members of the Commission appointed by the United States Government to investigate yellow fever in Cuba, was the first man in whom an infected mosquito, experimentally applied, caused yellow fever. Dr. Lazear, another member of the Commission was bitten accidentally by an infected *Stegomyia fasciata* and died of yellow fever in a week. It was during this enquiry that Dr. Aristides Agramonte showed that although he succeeded in isolating the *Bacillus icteroides* (Sanarelli) in about 33 per cent. of cadavers examined at Santiago, he also obtained the organism from cases that were not yellow fever, and concluded that it bore no relation to the disease.

[It may be that the U.S. observers have been too hasty in concluding that the *Bacillus icteroides* plays *no* part in the pathology of yellow fever. The bacillus may play a similar part in yellow fever that the coccus, described by Castellani and Portuguese observers, possibly does in sleeping sickness.]

Literary References.

TROPICAL DISEASES.

DYSENTERY.

Anders, J. M. The Treatment of Acute Dysentery, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli., p. 488.

Auché, B. Etude histologique des lésions du gros intestin dans un cas de dysenterie sporadique aiguë de l'enfance, *Journ. de méd. de Bordeaux*, 1903, vol. xxxiii., p. 402.

Note sur les lésions histologiques des ganglions mésentériques et de la rate dans la dysenterie sporadique aiguë infantile, *Journ. de méd. de Bordeaux*, 1903, xxxiii., p. 637.

Belleli, V. L'entéroclyse dans la dysentérie aiguë et chronique, *Rev. de thérap. méd. chir.*, Paris, 1903, vol. lxx., p. 80.

Bergey, D. H. The Reaction of Certain Water Bacteria with Dysentery Immune-Serum, *Journ. Med. Research*, Boston, 1903, vol. x., p. 21.

Besares, Q. S. Refutación hecha al método astringente en el tratamiento de la disenteria, *Rev. Ibero-Am. de cien. med.*, Madrid, 1903, vol. ix., p. 428.

Broïdo, Mlle. S. De l'agent pathogène de la dysenterie épidémique aiguë, *Gaz. d. Hôp.*, Paris, 1903, vol. lxxvi., pp. 781, 809.

Les dysenteries (étude critique), Paris, 1903, Naud, 171 pp., 8vo.

Brown, Capt., R.A.M.C. Bacteriology of Asylum Dysentery, *Jour. Roy. Army Med. Corps*, vol. i., No. 6., 1903, p. 425.

Brunton, Sir T. L. On Dysentery and Intestinal Hæmorrhage, *Lancet*, London, 1903, vol. ii., p. 7.

Burns, W. B. Malarial Dysentery, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli, p. 246.

Cain, J. S. Acute Sporadic Dysentery, *Trans. Med. Soc.*, Tennessee, Nashville, 1903, p. 45.

Chantemesse, A., and **Widal, F.** Ueber die Priorität der Entdeckung des Ruhrbacillus, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1903, vol. xxix., p. 204.

Dettling. Un cas de phlébite dysentérique., *Arch. de méd. et pharm. mil.*, Paris, 1903, vol. xlii., p. 264.

Doerr, R. Beitrag zum Studium des Dysenteriebacillus, *Centralb. f. Bakteriol.*, &c., 1 Abt., Jena, 1903, vol. xxxiv., p. 385, 1 pl.

Dombrowsky. Zur Biologie der Ruhrbacillen, *Arch. f. Hyg.*, München and Berlin, 1903, vol. xlvii., p. 243.

Douglass, J. H. Dysentery amongst the Troops in South Africa, with its Treatment, *Dublin Journ. Med. Science*, 1903, vol. cxv., p. 255.

Dulin, E. A. Dysentery, *Kansas City Med. Rec.*, 1903, vol. xx., p. 253.

Fingland, W. The Successful Treatment of Sporadic Dysentery by Aplopappus Baylahuen, *Lancet*, London, 1903, vol. ii., p. 456.

Firth, Lieut.-Col., R.A.M.C. Comparative Study of Dysentery Bacilli, *Jour. Roy. Army Med. Corps*, vol. i., No. 6, 1903, p. 436.

Flexner, S. Infection with the Bacillus of Dysentery, with Especial Reference to its Rôle in the Summer Diarrhœas of Children, Year Bk. M. Ass. Gr., New York, 1903, p. 67.

Futcher, T. B. A Study of the Cases of Amœbic Dysentery occurring at the Johns Hopkins Hospital, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli., p. 480.

Gay, F. P. The Types of B. Dysenteriæ (Shiga), in Relation to Bacteriolysis and Serumtherapy; an Experimental Study, *Univ. Penn. M. Bull.*, Phila., 1903-4, vol. xvi., p. 171.

and **Duval, C. W.** Acute Dysentery associated with the two Types of Bacillus Dysenteriæ (Shiga), *Univ. Penn. M. Bull.*, Phila., 1903-4, vol. xvi., p. 177.

Githens, T. S. A Case of Femoral Thrombosis in Chronic Dysentery, *Univ. Penn. M. Bull.*, Phila., 1903-4, vol. xvi., p. 246.

Goldsmith, F. Treatment of Tropical Dysentery, *Australasian Med. Gaz.*, Sydney, 1902, vol. xxi., p. 616.

Goltman, M. The Treatment of Acute and Chronic Dysentery, *Memphis M. Month.*, 1903, vol. xxiii., p. 73.

The Surgical Treatment of Chronic Dysentery, *Memphis M. Month.*, 1903, vol. xxiii., p. 98.

Guibaud. La dysentérie, maladie septicémique, *Presse méd.*, Paris, 1903, vol. ii., p. 662.

Harris, H. F. Pathology and Clinical History of Amœbic Dysentery, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli., p. 476.

Hewlett, R. T. The Etiology of Dysentery, *Journ. State Med.*, London, 1902, vol. x., p. 702.

Hetsch, H. Weiteres zur kulturellen Differenzierung der Ruhrbacillen gegenüber ruhrähnlichen Bakterien, *Centralbl. f. Bakteriol.*, &c., 1 Abt., Jena, 1903, vol. xxxiv., p. 580.

Huber. Dysenterieamöben, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1903, vol. xxix. Ver.-Beil., p. 267.

Jürgens. Zur Aetiologie der Ruhr, *Deutsche med. Wchnschr.*, Berlin, vol. xxix., No. 46.

Kharitonoff, L. A. Treatment of Dysentery, *Voyenno-med. Journ.*, St. Petersburg, 1903, vol. i., med. pt., p. 848.

Kieffer, C. F. Tropical Dysentery, *Phila. Med. Journ.*, 1903, vol. xi., p. 209.

Köhler, L. Zur Behandlung der Dysenterie in den Tropen., *Therap. Monatsh.*, Berlin, 1903, vol. xvii., p. 459.

Kruse. Die Blutserumtherapie bei der Dysenterie, *Deutsche med. Wchnschr.*, Leipz. and Berl., 1903, vol. xxix., p. 4.

Zur Geschichte der Ruhrforschung und über Variabilität der Bakterien, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1903, vol. xxix., p. 201.

Kurtz, R. L. A Case of Amœbic Dysentery in Illinois, with Special Reference to Acetozone Treatment, *Medicine*, Detroit, 1903, vol. ix., 595; also *Med. Fortnightly*, St. Louis, 1903, vol. xxiv., p. 535.

Le Dantec. Dysenterie spirillaire, *Compt. rend. Soc. de biol.*, Paris, 1902, vol. lv., p. 617.

Le Roy des Barres, A. Dysenterie aiguë, infection secondaire de la prostate, des vésicules séminales, du canal déférent et du testicule; guérison après évacuation spontanée par les voies naturelles du contenu infecté des deux vésicules séminales, *Gaz. hebd. de méd.*, Paris, 1902, n. s., vol. vii., p. 1159.

Lentz, O. Weitere Beiträge zur Differenzirung des Shiga-Kruse'schen und des Flexner'schen Bacillus, *Ztschr. f. Hyg. u. Infectionskrankh.*, Leipzig, 1903, vol. xliii., p. 480.

Mason, C. F. Bacillary Dysentery (Shiga), *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli., p. 242.

Matsushita, S. Dysentery, *Juntendo Iji Kenkiu Kwai Zasshi*, Tokyo, 1903, p. 742.

Moll, F. W. The Prevention of Dysentery in the London County Asylums, *Arch. Neurol. Path. Lab.* London; County Asyl., Claybury, London, 1903, vol. ii., p. 735, 3 pl.

Morgenroth, Dr. Über Ruhreintersuchungen in China, in besonderen über die Bakterienarten, die bei chinesischer Ruhrgefunden und durch Blutserum agglutin cert wurden, *Archiv fur Schiffs und Tropen Hygiene*, January, 1904.

Muramatsu, K., and **Nitsuma.** Results of the Comparison of the Drug and Serum Treatment of Dysentery occurring in the Normal School of Yamanashi Province, Japan, *Tokyo Iji Shinshi*, 1903, p. 389.

Neisser, M., and **Shiga, K.** Ueber freie Receptoren von Typhus- und Dysenteriebazillen und uber das Dysenterietoxin, *Deutsche med. Wchnschr.*, Leipz. and Berl., 1903, vol. xxix., p. 61.

Olinto de Oliveira. Dysenterische Leberabszesse bei Säuglingen, *Monatschr. f. Kinderh.*, Liepz. and Wien., 1903, vol. ii., p. 290.

Onishi, S. The Treatment of Dysentery, *Sei-i-Kwai M. J.*, Tokyo, 1903, vol. xxii., p. 13.

Paranhos, U. Contribution à l'étude de la dysenterie dans les pays chauds, *Progrès méd.*, Paris, 1903, 3 s., vol. xviii., p. 33.

Park, W. H., and **Carey, H. W.** A Report of the Bacteriological and Pathological Finding in a Fatal Case of Dysentery at Tuckahoe, with Additional Notes upon the Serum Reactions obtained with the Blood from a number of the Dysentery Cases, *Amer. Public Health Assoc. Report*, 1902, Columbus, 1903, vol. xxviii., p. 465.

The Presence of the Shiga Variety of Dysentery Bacilli in an Extensive Epidemic of Dysentery, with Notes upon the Serum Reactions obtained, *Journ. Med. Research*, Boston, 1903, vol. ix., p. 180.

Pridmore, W. G. Serum Agglutination and Acute Dysentery, *Indian Med. Gaz.*, Calcutta, 1903, vol. xxxviii., p. 13.

de Quadros, J. I. Case of Dysentery Treated by Tincture of Monsonia ovata, *Indian Med. Gaz.*, Calcutta, 1902, vol. xxxvii., p. 489.

Report of the Commission on the Nature, Pathology, Causation, and Prevention of Dysentery and its Relationship to Enteric Fever, appointed by the Secretary of State for War, August, 1900, London, 1903, Eyre and Spottiswoode, 147 pp., 20 pl., 3 ch., fol.

Reynaud, G. Des complications de la dysentérie chronique; hémorragies intestinales; guérison, *Caducée*, Paris, 1903, vol. iii. p. 57.

Roberts, W. The Therapy of Dysentery, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xl., p. 968.

Rogers, L. Further Work on Amœbic Dysentery in India; the Mode of Formation of Secondary Amœbic Abscess of the Liver, with a Note on the Serum Test for Dysenteries, *Brit. Med. Journ.*, London, 1803, vol. i., pp. 1315, 1 pl.

Note on the Bacteriology of Dysentery and the Value of the Serum Test in its Differentiation, *Indian Med. Gaz.*, Calcutta, 1903, vol. xxxviii., p. 53.

Rosenthal, L. Zur Aetiologie der Dysenterie; vorläufige Mittheilung, *Deutsche med. Wchnschr.*, Leipz. and Berl., 1903, vol. xxix., p. 97.

Salazar, M. M. Higiene militar de la disenteria, *Rev. de san. mil.*, Madrid, 1903, vol. xvii., 121.

Salle. Le pseudo-rheumatisme dysentérique et ses déterminations articulaires et ab-articulaires; arthropathies, myalgies et conjunctivites; leur nature bacillaire, *Bull. et mém. Soc. méd. d. hôp. de Paris*, 1903, 3. s., vol. xx., pp. 359.

Schlayer. Zur Diagnose des Leberabszesses nach Ruhr. *Munchen med. Wchnschr.*, 1903, vol. l., p. 1372.

Shipman, F. W. Observations on an Epidemic of Dysentery, *New York State J. M.*, New York, 1903, vol. iii., p. 316.

Shiga, K. Ueber die Priorität der Entdeckung des Ruhrbacillus und der Serumtherapie bei der Dysenterie, *Deutsche med. Wchnschr.*, Leipz. and Berl., 1903, vol. xxix., p. 113.

Ueber Versuche zur Schutzimpfung gegen die Ruhr., *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1903, vol. xxix., p. 327.

Shiga, S. Researches on a Case of Dysentery with a View to Etiology and Diagnosis, *Saitake Gaku Zasshi*, Tokyo, 1903, p. 501.

Skinner, G. A. Dysentery, *St. Paul M. J.*, St. Paul, Minn., 1903, vol. v., p. 582.

Suzuki, K. The Complete Destruction of Dysentery, *Dai Nippon Shiritsu Eisei Kwai Zasshi*, Tokyo, 1903, p. 471.

Symposium on Dysentery, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli., pp. 173, 242, 476.

Tanoka, S. Pathological Studies on Amœba Dysentery, *Chiugai Iji Shinpo*, Tokio, 1903, p. 721.

Vaillard, L., and **Dopter, C.** Contribution à l'étiologie de la dysenterie; la dysenterie épidémique, *Ann. de l'Inst. Pasteur*, Paris, 1903, vol. xvii., p. 493, 5 pl.

Etiologie de la dysenterie épidémique, *Presse méd.*, Paris, 1903, vol. i., p. 375.

Vincent. La pluralité des dysenteries, *Arch. de méd. et pharm. mil.*, Paris, 1903, xlii., p. 371.

Ward, S. B. A Case of Dysentery due to Double Infection with the Uncinaria Duodenalis and the Amœba Coli, *Albany Med. Ann.*, 1903, vol. xxiv., p. 23.

White, A. T. A Case of Acute Dysentery in which Death occurred from Acute Cardiac Dilatation, probably due to Chronic Phenacetin Poisoning, *Journ. Trop. Med.*, London, 1903, vol. vi., p. 176.

Weisenburg, T. H. The Treatment of Tropical Dysentery with Sulphur, *Phila. Med. Journ.*, 1903, vol. xi., p. 474.

Young, G. B. Amœbic Dysentery, *Amer. Prac. and News*, Louisville, 1903, vol. xxxv., p. 241. [Discussion], p. 288.

Zimmermann. Schwere Dysenterie, *Militärarzte, Wien*, 1903, vol. xxxvii., p. 30.

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The Journal of Tropical Medicine.

CONTENTS.—MARCH 15TH, 1904.

Original Communications.

COLD WEATHER MOSQUITO NOTES FROM INDIA.—MALARIA IN UMRITZAR AND ITS CAUSES.

By Lieut.-Col. G. M. GILES, M.B., F.R.C.S., I.M.S. (Retired).

(*Continued from p.* 52.)

THE town of Umritzar has been long notorious for the prevalence and virulence of malaria. As a rule, the disease, as one sees it in India, lames rather than kills; but every now and again Umritzar is swept by epidemics of intense virulence.

In one that attacked it, if I remember rightly, in 1880, the mortality was so severe, and characterised by such violent gastro-intestinal symptoms, that the medical officers in charge were for some time in doubt as to whether it was malaria or cholera that they had to deal with.

The town itself and the "civil lines" wherein are situated the public offices and residences of the European civil officials, bear the worst of reputations as to malaria, while the cantonment is said to be fairly healthy, though the garrison always suffers severely on account of its supplying the troops that hold the fort of Govindgurh, which is situated about 500 yards to the north-west of the old city walls.

The fort is a picturesque old relic of Sikh times, of antiquated trace, replete with what sappers call dead angles, and completely surrounded by a ditch, always containing water, from 30 to 50 yards wide; besides which there are four large ravelins, which are cut off from the main fort by branch moats, so that altogether there must be an area of somewhere about 2,000 yards by 30 yards of stagnant water within and around the area of the fort. The greater part of the ditch is faced with nearly vertical walls, and much of it is too deep for the growth of water plants; but in the shallower places there are large patches of grass and reeds, which rise above the surface of the water, and form ideal breeding places for mosquitoes. Notably, the outer face of the ditch of the north-west ravelin has either never been rivetted or its wall has fallen into disrepair, and the ditch is nowhere more than knee-deep, and covered with a growth of tall grass, sufficiently sparse to afford the ample exposure to the sun, so beloved by the *Anopheles* larva.

As far as I can make out, the portions of the ditch free from vegetation showing above the surface, do not harbour wintering larvæ; but the weedy area absolutely swarms with them, each stroke of my little aluminium colander landing some three or four. As a rule, one has to do a bit of fishing before demonstrating the presence of larvæ in winter; but even in the height of the breeding season I have seldom met with a collection of water so absolutely alive with larvæ as this portion of the fort ditch is in the depth of winter. The commonest species is the *Myzorhynchus* (?) larva figured in a previous letter; but there are also a few *Mygomyia Rossi*, and one or two other species which I have as yet not found time to dissect.

Previously to examining the fort ditch, I had been in some doubt as to whether wintering larvæ were to be found so far north, as the only likely places I could discover were some pits near the jail, and none could be found there. I subsequently found that these pits, during the rains, had been paraffined by that keen sanitarian, Lieut.-Col. Mulroney, I.M.S., as superintendent of the jail.

It may naturally be asked why this treatment was not extended to other dangerous collections of water. The reply is that the civil surgeon, as superintendent of an Indian jail, is absolute ruler within its boundaries, having not only the medical but the executive charge of these institutions; and that the administrative officers of the jail department are also medical officers and sanitary experts, with the natural result that provided a superintendent can show good financial and disciplinary results, and keep his jail birds healthy, he is left a very free hand as to the measures he adopts to secure his results, and, above all things, need consult no one before taking practical measures.

To carry out the same course of action for a municipality, the civil surgeon would first have to win over

the deputy commissioner, who very possibly would regard the matter as a mere "doctor's fad," and in any case would consider himself as competent to criticise the suitability of the proposed measure *ex cathedra*, as something more than an expert, *viz.*, as the terrible so-called common-sense man. Having captured the deputy commissioner, the latter would have to persuade a municipal committee, largely of natives, which, though probably composed mainly of sound business men and clever lawyers, would be naturally rather backward in its sanitary notions.

Lastly, supposing all concerned converted into enthusiastic devotees of the most modern sanitary advances, no funds would be available; and that would bring the matter to a close with no better result than the addition of long files of correspondence to the archives of the various offices concerned.

In the case of a place under military control, the "proper channel" would differ; but the result, in all probability, the same. In each case the individual links of the chain are probably men of more than average ability; but the division of responsibility is fatal to practical action.

In the case of the fort ditch, if I may trust to gossip, someone actually proposed to deal with it by means of paraffin; but someone else objected that its use might give rise to danger from fire to the wooden piers of the bridges that cross the moat. It does not appear to have occurred to anyone to try the experiment on some of the large and perfectly safe expanses of water close by, or there may have been some doubt as to whose business it was to do so; but in any case nothing was done, though it is needless to say that the resulting film of oil is so thin that it would be impossible for the brightest genius to fire the Thames in this way.

I should like to have presented your readers with a photograph of the fort ditch as a typical habitat of wintering larvæ; but at the door of the fort is posted a prohibition against photographing and sketching, the efficiency of which, as a guard against Russian intrigue, may be judged from the fact that I had actually paraffined a hundred yards of the ditch, and made a rough prismatic compass survey of the fort, in case a map should be desirable to illustrate these remarks, before I came across the notice. Not being desirous, therefore, of figuring as an English edition of Capt. Dreyfus, the proposed photograph has not been taken.

There can be no doubt that this exceptionally fine breeding place is the main cause of the notorious unhealthiness of Fort Govindgurh, and that steps ought at once to be taken to render it innocuous. It would be very difficult to fill in the ditch and impossible to drain it; but something might be done by clearing away the reeds and grass, and deepening it so as to prevent their renewed growth, as well as by the introduction of fish. The expedient of deepening the ditch would have the additional advantage of affording spoil wherewith to level the glacis of the fort, which centuries of untidiness have left so cut up that it must be a perfect network of puddles during the rains, especially on the face of the port towards the city, on which there are a number of excavations dug at some time to obtain *kunkur* for road metal, quite large enough to form excellent rifle pits, and so one would think extremely objectionable even from a purely military point of view.

Probably, however, the cheapest, and certainly the most immediate plan, would be to periodically paraffin the ditch, and to deal with the glacis separately by levelling off the hummocks into the depressions.

There must in all be rather over a mile of ditch, about 30 to 50 yards wide; and being anxious to ascertain what would be the cost of dealing with the swarming mosquito larvæ by oiling, I purchased a tin of the cheapest kerosine oil, locally obtainable for Rs. 2, annas 5. Such a tin is stated to contain 32½ lbs. of kerosine. The water of the ditch of one of the ravelins is easily accessible, and being no more than knee deep, is almost completely grass-grown, though the individual plants do not grow very closely.

I have found that by far the best appliance for oiling a large expanse of water is an ordinary "watering pot" swung in rapid sweeps, so as to sprinkle the drops of oil as widely as possible; so taking with me a mali, or gardener—well practised in the use of the instrument—I proceeded one morning with my tin of oil to the scene of operation. By wading in the water, the mali was able to effectively oil about 100 yards of the ditch with the 32½ lbs. of oil—*i.e.*, a space of 100 by 40 yards, as the ditch was here wider than in most places.

The next morning I revisited the spot, and was more than agreeably surprised at the effective way in which the oil had acted. Within the area dealt with not a single air-breathing arthropod remained alive, and the water was simply covered with dead water-beetles and other adult insects, while no mosquito gnat larvæ could be found. Presumably, they had sunk to the bottom after death. The only insect larvæ left alive were certain, I think, ephemerid larvæ, which breathe not air, but the dissolved oxygen of the water, by means of tracheal gills—and even these were evidently hard hit. The effects of the oil had extended about 20 yards to windward, and the film could be traced quite a 100 yards to leeward; but whether or not with lethal effect I was unable to ascertain, as that portion of the ditch being rivetted with vertical brick walls was inaccessible.

Being desirous of demonstrating the method of searching for larvæ to a medical friend, I again visited the ditch the morning after, and found that the effects of the oil were now traceable for fully a 100 yards to windward of the area treated, so that it was only with difficulty that I succeeded in finding a few living *Anopheles* larvæ in the most distant corner of the accessible portion of the ditch.

From these data it may easily be calculated that it would cost somewhere about Rs. 30, or £2, to efficiently treat the whole of the ditch; so that allowing for about twenty applications during the year—viz., three times a month during the rains and once a month during the rest of the year—the annual cost of keeping this dangerous ditch free from larvæ would not exceed the trifling sum of £40 per annum, or less than half the cost to the State involved in the death or invaliding of a single soldier.

There is a large and very foul expanse of water,

known as the city ditch, about 500 yards to the south of the fort, but from its character it is hardly likely to be a breeding place for any of the more dangerous species to any important extent, and provided that the fort ditch were kept constantly kerosined, the glacis levelled, and the barracks within the fort were properly protected with wire gauze, I can see no reason why Fort Govindgurh should not be a fairly healthy place, though no possible measures are likely to make it a comfortable place of residence during the summer months.

As the garrison of the fort is a small one, the cost of trying the experiment of gauze protection on the lines laid down by Prof. Celli would not be serious, and the fact of the place having the worst of reputations for malaria would make it a most suitable place for experiment.

The cantonment is at some distance from the fort, and is, I am glad to say, not under canal irrigation; but it is almost needless to remark that not even the hospitals are properly protected with gauze, and that apparently no attempt whatever has been made to utilise our knowledge, now four years old, of the causation of malaria for the protection of the troops.

The writer is not amongst those who believe that anything in the way of detailed measures can for the present be accomplished for the protection of our native cities for some time to come. The utmost that can be expected is a certain amount of levelling and filling in of tanks, and a proper supervision of hydrants, so that they may not become a source of puddles in the very heart of the populated area; and in no city has so much in this direction been accomplished as in Umritzar, under the sanitary *régime* of Col. Mulroney. For nearly half the circuit of the city the broken ground, full of alternating brick pits and mounds, which surround every Indian town, has been reclaimed and levelled, and is now fertile garden land instead of a foul and continuous refuse heap, absolutely useless for all purposes of cultivation or habitation, and a standing danger to the community. Unfortunately, this reclaimed land has been put under canal irrigation, so that though the gain from the point of view of general sanitation must be considerable, as regards malaria the advantages must be doubtful.

Market gardening in India, where the necessary water is obtained from wells, is rarely very harmful, as the difficulty and expense of raising the water leads to economy in its use. In Umritzar there would be but little hardship in cultivators near the city being restricted to well irrigation, as the flooding of the surrounding district with canal water has so raised the spring-levels that well water is everywhere abundant, and no more than 15 to 20 feet from the surface. Fortunately the *rajbaha* that supplies the suburbs of the towns is some feet below the surface of the reclaimed land, so that a certain amount of lifting has to be performed, and with people of small means, such as the Punjabi gardener, even this amount of lifting is probably sufficient to prevent the worst abuses of canal irrigation.

The financial results of the reclamation of this waste land have, I believe, been excellent; for suburban land, where cultivable, everywhere commands a good rental, and the example of Umritzar might well be copied by the majority of Indian municipalities, almost every one of which is surrounded by a filthy belt of land so cut up by centuries of unsystematic excavation and brick making, as to be absolutely valueless to anyone but the few low-caste folks who eke out a precarious living by cultivating water-nuts in the foul ponds with which such places are dotted.

As already mentioned, these ponds are one of the favourite habitations of the wintering Anopheles larva, and during the fever season, must be far more efficient as breeding places than many times their area of even the worst forms of canal irrigation—the rice crop only excepted.

I understand that rice cultivation has been prohibited in the immediate vicinity of the neighbouring city of Lahore, and there can be no doubt that this prohibition should be extended to the immediate neighbourhood of all considerable inhabited sites. But the prohibition should go further in the case of centres of population of any size near which no canal irrigation by direct gravitation should under any circumstances be permitted, the "*rajbaha*" being carried at such a level as to necessitate a lift of 4 or 5 feet.

It would, I fear, be a mere counsel of perfection to suggest the abolition of canal irrigation near Punjabi towns, but the compromise above suggested would go far to do away with the worst evils of the system; for even with a lift of a few feet only, irrigation in the hands of a market gardener is a very different matter from the same system when left to the management of the servants of the comparatively rich, and always careless, European *Sahib*, who will work the latter's bullocks till his compound is turned into a swamp to save themselves the trouble of properly distributing the water by hand.

In all civil stations canal irrigation should be absolutely done away with. Quite apart from malaria even, it is extremely unhealthy to live on a sodden, waterlogged site, and the amount of sickness among civil officials of all departments, that is brought about by their living in houses surrounded by large over-irrigated gardens must be enormous, and the cost to Government in the way of pay to those on sick leave must be enormous—a loss which is all the more deplorable as it is to a great extent preventable, and might generally be avoided by insistency upon healthy sites and fairly habitable residences.

It is quite a mistake to suppose that the highly-educated Englishman is capable of looking after his own sanitary salvation. For one thing, he has usually very little time to devote to the task; but added to this, there are few people more obstinately prejudiced and more difficult to move in such matters. Often, indeed, he will be found to take a sort of pride in his foolhardiness where his health is concerned; to expose himself to the sun in a small hat, drink water from uncertain sources, and prefer the bliss of ignorance in the matter of how his food is prepared and where it comes from. Under these circumstances it is hardly surprising that, outside the medical profession, I have not as yet met with a single European in India willing

to put himself to the trouble involved in protecting himself against the attacks of mosquitoes.

Not long ago I was talking to a chance acquaintance who was under orders to proceed to Nowshera. Said he, "I believe it is the healthiest station in the Punjab, but it is an awful hole; not a tree in the place. And yet if the Government were not so—very—niggardly it would be easy to turn it into a garden, for the Kabul River flows close by it."

"Do you think," I replied, "it would remain healthy when you had turned it into a garden?"

"I daresay not; but one can only die once."

Moradabad Dist., *February 8th*, 1904.

YAWS: ITS INTRODUCTION INTO ANGUILLA IN 1902.

(*The Island of Anguilla lies sixty miles north-east of St. Kitts, West Indies.*)

By I. Numa Rat, M.R.C.S.

Yaws had not appeared in Anguilla within the memory of any of its inhabitants, until June, 1902, when a negress, aged 8, an Anguillian, returned here from a visit to St. Kitts, with a fungating ulcer on one of her ankles, which proved to be the primary lesion of an attack of frambœsia.

There were at the time seven members (including the parents) of the family to which the girl belonged; the other children being two girls aged 14 and 5, a boy of 12, and an infant a few months old. They lived in a one-roomed, thatched, unfloored hut, standing fifty yards away from the nearest dwelling.

Initial Infection.

In December, 1902, the eldest girl was suffering from a "scratch" on the upper part of her leg, which had suppurated, and she applied to it some of the ointment with which her infected sister was dressing the sore on her ankle. After a few days a fungating ulcer appeared on the site of the "scratch."

In January, 1903, the boy, aged 12, became infected with the disease through a wound on the foot, which shortly after began to fungate.

In June, 1903, the girl aged 5, was infected through a fissure between two of her toes, which gradually spread into a fungating ulcer.

As there were no cases of yaws in the island when the girl returned here from St. Kitts, the nature of her disease was unsuspected, and the parents continued to treat the sore for several weeks as an ordinary ulcer; nor do they seem to have attached any importance to the squames and papules which appeared on the patient between June and December, 1902. Nor even when the eldest daughter was infected was the disease recognised.

It was not until January, 1903, when the schoolmaster brought for my inspection the boy of 12, with a frambœsial granuloma on the scrotum, that it was discovered that yaws had been introduced into the island. The disease followed the usual course in the four cases. There was first the characteristic change in the lesion at the site of infection, and then, after a few weeks, a general eruption consisting of squames and papules, of which only a very few developed into granulomata.

Treatment.

The treatment of all the cases consisted of perchloride of mercury in small and perchloride of iron in moderate doses during six months. By June, 1903, the two elder girls showed no symptoms of the disease. The infection proved more rebellious to treatment in the boy, in whose case, after the disappearance of the general eruption in July, 1903, hard papules developed on the knees and fronts of the legs, and on the elbows and backs of the arms. These disappeared, as usual, very gradually, and even up to the present a few of them are yet to be seen. The boy was also the only one in whom granulomata appeared on the soles of the feet. These persisted six months after the general eruption had disappeared.

The disease in the case of the youngest girl, aged 5, was of a much milder form, the cutaneous symptoms consisting only of squames and papules and a solitary granuloma on the buttock. On account, presumably, of the mildness of her attack, the mercury was not persevered with as in the other cases, and she still exhibits squames and papules, but no granulomata. In addition to the mercury and iron internally, sulphate of copper was applied to the granulomata in the soles of the boy's feet, and all the patients were washed with water and a soap containing perchloride of mercury. The application of this soap was considered by the mother of the children as very effective in getting rid of obstinate squames and papules; and it certainly seemed to be useful both for that purpose and for preventing the appearance of any further eruption.

The Nature of Yaws.

I have already pointed out in a previous paper the necessity of determining whether yaws is a purely constitutional disease, or whether, like tuberculosis, it may be either constitutional or local, or both. Different views have been held as to its nosology, and the present one is that it is a constitutional disease. It is, however, possible that its germs may affect the skin without invading the system generally, or, which appears to me probable, that while it may be a general affection resulting from the introduction of the virus through some cutaneous lesion, the microbes may subsequently find their way into the frambœsial eruption, thus aggravating it and producing the granulomata and ulcers, which appear at later stages of the disease. It is possible that the squames and papules are the only true secondary symptoms of the systemic infection, and that the granulomata are caused by an effort of the skin to repel the germs attacking it from without.

We have yet to learn also to what extent the system may become infected through the granulomata, and whether it is not through them that the virus is admitted which produces the eruptions supposed by some to be the symptoms of a fresh infection, and by others to be further manifestations of the original

attack. Such considerations suggest the need of external applications which will not only destroy the granulomata and cause the disappearance of the squames and papules, but will also prevent the invasion of the skin by frambœsial or other microbes. Germicidal remedies should be freely used with this object, and it is with this intent that I directed the bodies of the patients herein mentioned to be washed twice a day with the sublimate soap. The floors of yaws hospitals should also be frequently disinfected, as well as the bedclothes and apparel of their inmates.

Yaws a Place Disease.

Children discharged from a yaws hospital, and allowed to return to the dwellings in which they contracted the disease, are thus exposed to further infection. In such circumstances the eradication of the affection is an impossibility. If the houses in which they live have wooden or stone floors, these should be disinfected. If not, the upper layer of the earth within the houses and in their immediate neighbourhood should be removed to a sufficient depth and thrown away, after having been disinfected, and should be replaced by fresh uninfected earth. Such a measure would furthermore assist in preventing the infection of other members of the family.

The exemption of the parents and the infant in the case under notice is due to their freedom from cutaneous lesions, and also to their bodies not coming in contact with the soil. Children that are too young to crawl about the floor, and are therefore kept either in bed or in their mother's arms, hardly ever, in my experience at least, contract the disease; and adults, apart from the protection which a previous attack may confer, more frequently escape infection by reason of their being more adequately clothed than children, and their greater freedom from the wounds and scratches and eruptions which are so prevalent among the latter. They do not, moreover, sit and lie on the ground with that sublime disregard of consequences which is specially characteristic of the young negro.

It is to be hoped that the withdrawal of the children from school, and the great distance of their dwellings from the nearest ones, will prevent the extension of the disease.

In some of the districts, however, in which yaws is endemic, as in Dominica, the people's dwellings are widely scattered, and it is difficult to explain the diffusion of the infection by communication except as the result of the collection together of the children at school. And yet it can only be in rare cases that a child suffering from yaws, in a locality in which the affection is well known, is able to conceal his condition so effectually as to be allowed to continue his attendance at school.

There is no evidence to suggest that yaws is an airborne infection; but the germs very probably exist and develop in the soil, and its prevalence as an epidemic, in the absence of sufficient personal communication, leads to the conclusion that it is a place disease, the germs of which develop more freely at certain seasons than at others.

The soil in the unfloored huts of families affected with yaws is the breeding ground of the frambœsial germs, and anyone occupying any of these huts who is suffering from any lesion of the skin is liable to be infected by them. Thus the disease is not communicated from family to family, but each family has its own source of infection in its own home.

This explains the failure of such institutions as the Yaws Hospital in Dominica to stamp out the disease. The inmates, on returning to their homes, are re-infected and there are always fresh cases for admission periodically furnished from the germ-infected dwellings.

The only measures by which the disease can be eradicated are the simultaneous segregation of all the yaws cases for a sufficient period to ensure their cure, the thorough disinfection of all yaws hospitals to prevent the reinfection of their inmates, and the destruction of all the germs in the infected huts and in their immediate neighbourhood.

THE ELUCIDATION OF SLEEPING SICKNESS.

By Dr. Louis Sambon.

(*Continued from p.* 74.)

Discussion on Dr. Sambon's Paper.

The President said he thought that Dr. Sambon's paper, and the discussion which it was hoped would follow, would form a most valuable contribution to the *Transactions* of the Society. He considered that they had listened to a most interesting paper, and one which would give rise to considerable discussion, in which it was hoped that a great many eminent men who had had great facilities for studying this question would take part.

He had had letters expressing regret at being absent from Professor Clifford Allbutt, Sir Michael Foster, and others; and he would now ask Sir Patrick Manson to open the discussion.

Sir Patrick Manson: I feel a great responsibility in opening this discussion, because I cannot but recognise that the subject is one of very great importance, not only to Africa—where it is really a subject of primary importance—but to pathology in general; for the entrance of these protozoa into the field of pathology promises to shed new light in places where darkness formerly prevailed, and one must be extremely careful in expressing any opinion or view upon the subject, just when it begins to break upon the medical mind.

I was especially pleased with the last part of Dr. Sambon's paper—that in which he expresses a hope that questions of priority will not occupy the meeting. They are always thorny questions, and they lead to a good deal of bad feeling, and do not, so far as my experience goes, conduce to general profit. Sometimes, on a Sunday, I have an opportunity of contemplating the manners and customs of a fowl-run. My observations are usually conducted in the afternoon, between the morning meal and the afternoon meal, when the fowls are at leisure; they have picked up the last grain of the maize that has been thrown to them, and have nothing very much to do, as there is little or no chance

of getting more food just then. You may see in such a community of fowls some enterprising explorer who, wandering away from the others, by dint of perseverance picks up a fine fat worm in some corner of the run. Almost before you have observed the fact that this fowl has made a discovery all his mates have also observed the fact, and immediately this knowing fowl is beset by hundreds of other fowls eager to share the profit, and, as a rule, the first fowl is very quickly deprived of his morsel. A second fowl succeeds in nipping a little bit off the end, a third fowl seizes it, a fourth and then a fifth, until in time you find that the discovery has become common property; with the result that I, the owner of the fowls, am the principal beneficiary, inasmuch as I get probably a plumper chicken or a more nutritious egg the next morning. Now I think this is a fair illustration of what happens in the field of discovery. One man gets hold of a little worm, and immediately a hundred men seek to extract a little nutriment—a little *éclat*—from the discovery, and in the end the whole world benefits. I hope these things will be borne in mind during our discussion.

I learnt a lesson from this matter of the cause of sleeping sickness. Dr. Sambon has told us already that a good many years ago I found a peculiar parasite in cases of the disease we are discussing. I found, in a case that Dr. Mackenzie gave me the chance of examining, a new species of filaria—*Filaria perstans.* I was very much interested in this subject, and finding a new parasite in what was practically a new disease, I was inclined to jump to the conclusion that the new parasite and the new disease were essentially related to each other; the conclusion seemed natural.

As soon as I had made the observation, I bethought myself how I should pursue the subject, and I determined to send to all corners of Africa for specimens of blood from the natives. I sent about 10,000 slides to Africa, and I got about 300 back; but a good many came from cases of sleeping sickness, and in every case of sleeping sickness I found *Filaria perstans.* By-and-by Dr. Grattan Guinness imported two cases of sleeping sickness into England for purposes of study, and was kind enough to put them at my disposal. I was much gratified to find in the blood of these two cases also *Filaria perstans.* Now with evidence of that sort at disposal, I think it would be beyond the powers of resistance of most human natures to abstain from saying that *Filaria perstans* was the cause of sleeping sickness. Yet even then I resisted the temptation. I said it was very likely; at all events we had some ground for pursuing the subject further. When afterwards the same parasite was found in British Guiana, I was somewhat disappointed, because at that time we had no knowledge of sleeping sickness in British Guiana. I wrote to a friend of mine there, and asked him if he knew of any cases resembling sleeping sickness in British Guiana, and he wrote back and said that a patient had been brought to him suffering from a condition of somnolence from which her friends had great difficulty in awaking her. This information somewhat encouraged the idea that, possibly in this very little-known country sleeping sickness might exist, and the existence of sleeping sickness there would further endorse the possibility of *Filaria perstans* being the cause of the disease.

By-and-by, when Drs. Low and Castellani went out to Uganda to investigate the subject, they went out with distinct instructions from the Royal Society to ascertain as to how far this particular filaria might be connected with sleeping sickness. Their first reports and private letters were distinctly in favour of regarding this parasite as the cause of the disease, for Drs. Low and Castellani found something like 95 per cent. (I forget the actual figures) of the natives of Uganda who were suffering from sleeping sickness to be the subjects of *Filaria perstans.* But later, on extending their observations, they made the somewhat disconcerting discovery that although in Uganda itself, or rather in the particular part they were investigating, *Filaria perstans* and sleeping sickness seemed to occur together, yet in another district where the sickness was epidemic, *Filaria perstans* seemed to be entirely absent. Thus at one stroke was destroyed a hypothesis from which I had begun to think I might derive a little credit. And I am now obliged to disavow any connection of *Filaria perstans* with sleeping sickness further than an accidental one.

And as regards the connection of this new parasite, the trypanosoma, with sleeping sickness, we have still to bear in mind my experience with *Filaria perstans.* My creed is—my belief is—that sleeping sickness is caused by *Trypanosoma gambiense*, but I will not say that it has been proved. My creed at one time was that sleeping sickness was caused by *Filaria perstans*, but I could not say that it had been proved. I still think there is room for further proof on the subject of a distinct and definite connection between the *Trypanosoma gambiense* and sleeping sickness. Observe that there is a difference between belief and knowledge—I believe it is the cause. I do not know for certain that it is. It is true the case to which Dr. Sambon has referred, a patient of mine who died recently of sleeping sickness, has added another reason for our believing in the close relationship of the parasite with the disease. But even that additional fact is not sufficient for the scientific mind. Concurrence even in that case may have had something to do with the matter.

When Dr. Castellani's discovery and Colonel Bruce's extension of that discovery were first made public, I was extremely sceptical as to the relationship of the two parasites, and for this reason: Colonel Bruce distinctly states that 28 per cent. of the whole population of Uganda have got the trypanosoma in their blood. Now sleeping sickness is a disease that certainly predisposes the human body to many kinds of parasitical invasion; inasmuch as, in consequence of its paralysing effects on the sensory nerves, and especially on the cutaneous sensations, and the indifference to what goes on outside the patient which is characteristic of the disease, carriers of parasites, such as flies, ticks, bugs, and so on, can make bites with impunity and not be brushed away. One can understand that a patient afflicted with the indifference and languor so characteristic of sleeping sickness would be extremely prone to be bitten by insects and therefore is just the person most likely to acquire the parasite in question. In

the same way, I believe he is specially subject to invasion by *Filaria perstans*. Therefore it seemed to me that the evidence was nothing approaching what would be regarded as satisfactory from a scientific point of view. But when the poor lady, in whom I had found (or rather Dr. Daniels had found) the trypanosoma a good many months ago—long before she exhibited the languor of sleeping sickness (the parasite undoubtedly was the initial cause of her disease when on the Congo)—when the lady developed sleeping sickness, I thought we had a much more definite proof than has been supplied from Uganda. She had no opportunity of being bitten while in a torpid condition, no opportunity of being bitten by *Glossina morsitans*, and no opportunity of subsequent infection following the primary infection by the animal, whatever it may be, that introduced the Trypanosoma. Therefore I think that this case is one of very great importance, as affording not complete but additional proof that this parasite is the cause of the disease. Still, it is conceivable that even in her case the two conditions—Trypanosoma in the blood and an independent disease—might occur; and, until we have obtained constant results from inoculations of pure cultures of the Trypanosoma, I say the subject is not closed, and we still ought to maintain an open mind as to the relationship of the Trypanosoma to the disease. My belief—founded on a consideration of the probabilities (nothing more)—is, that this parasite is the cause of the disease; but I cannot say that it has been scientifically and conclusively demonstrated. I hope that cultivation experiments similar to those that have been made lately by two American scientists with *Trypanosoma Lewisi* and *Trypanosoma Brucei*, will be made with *Trypanosoma gambiense* and applied to the decision of this question. Until the thing is positively decided one way or another, I think one incurs a certain amount of responsibility and danger in advising anything like expensive measures with a view of counteracting Trypanosoma in connection with sleeping sickness. To base expensive measures on what may be only a speculation and not a fact, is somewhat dangerous ground for men responsible for the conduct of public affairs. So I would urge on those who are interested in this question to undertake these cultivation experiments. And then, if we find that pure cultures of *Trypanosoma gambiense* in an animal, or in a human subject, if anyone is sufficiently self-sacrificing to offer his own person, produce symptoms of sleeping sickness—then I should say the thing is mathematically proved, and we should be content and act.

I should like to point out one or two things that have struck me in connection with this thing as worth deciding. Colonel Bruce has distinctly proved that the monkey (and his experiments have been repeated in Paris and elsewhere)—or certain species of monkey, at all events—is susceptible to Trypanosoma infection. This being so, is there any evidence that the wild monkeys of Uganda have got sleeping sickness? I do not think those experiments by Bruce of injecting blood or cerebro-spinal fluid of patients infected with sleeping sickness into, and subsequently inducing sleeping sickness in the monkey, along with Trypanosoma in the blood, are conclusive as to an essential connection between Trypanosoma and sleeping sickness. Supposing that we assume these are independent diseases, and that there is no connection between Trypanosoma and sleeping sickness; you take the blood of a patient suffering from sleeping sickness, and also Trypanosoma, and you inject this into the monkey, and you produce two diseases—trypanosomiasis and sleeping sickness. Suppose you had a patient suffering from plague, and at the same time from relapsing fever, and you take a little of that patient's blood and inject it into a sound man's veins; in that sound man you produce two diseases—plague and relapsing fever. You would find *Bacillus pestis*, and you would find *Spirillum Obermeieri* in that man's blood; but it would not follow that the *Bacillus pestis* was the cause of relapsing fever, or that the *Spirillum Obermeieri* was the cause of plague. Neither does it follow from *these* experiments by Bruce, that a definite relationship between the Trypanosoma and sleeping sickness has been established.

I should very much like to know whether monkeys are subject to sleeping sickness, and whether there has been any epidemic of the disease amongst these animals.

Professor RAY LANKESTER: May I venture, not as a member of the medical profession, but as one who takes a great interest in the subject from what I may call the "natural history" point of view, to make a few remarks.

My own interest in this matter began with the study, some years ago, of the Trypanosoma which occurs in the blood of the frog; and I believe that I was the first to study this, and to write about it, after Grubey. It had not been mentioned in the interval, and at the time (1870) I missed Grubey's account (it was a very old one), and described it as a new parasite. It subsequently turned out that this parasite was the one called Trypanosoma by Grubey. Since then I have always taken great interest in these parasites of the blood. I very much doubt, for one thing,—although I see that Laveran and Mesnil take the opposite view—I very much doubt whether it is really right to call these parasites of the mammalia by the name Trypanosoma. I think zoologists would say that there is a generic distinction between the original Trypanosoma and the forms allied to it, which occur in mammalia and in birds; and therefore it is rather awkward that this word has become so commonly used. I think zoologists will say that the name "Herpetomonas," which was given by Savile Kent to Lewis's parasite (the one he got from the rat), must become that of a genus for the mammalian species of Trypanosoma.

I would say, further, that I listened with great pleasure to Sir Patrick Manson's statement, which was an extraordinarily interesting account of his views and theory on the matter, and was the statement of a really scientific attitude as to the outcome of this question. He had had strong presumptive evidence with regard to *Filaria perstans*; but he did not commit himself about it, and I think that the doubt he has pointed out to us with regard to Trypanosoma is absolutely correct and sound. There is a great deal of converging evidence, which amounts to cumulative evidence in favour of Trypanosoma being the cause of sleeping sickness, but it is not absolutely proved to be

so. The possibility of another parasite accompanying the present one in the blood has to be borne in mind. We are getting to know such extraordinarily minute and varied parasites in the blood of mammalia in tropical countries, that we have to be very careful as to the conclusions which we form.

I think it is not desirable to discuss questions of priority on the present occasion; but I think that Dr. Sambon should correct the statements in his paper by reference to the Report of the Commission of the Royal Society, in which he will find that Dr. Castellani did not attach any importance to the fact that his sleeping sickness patients had Trypanosoma in their blood until Colonel Bruce pointed it out; and it was Colonel Bruce who initiated and carried out the investigation which proved the invariable presence of Trypanosoma in sleeping sickness.

Another point which struck me was that in one or two matters Dr. Sambon seems inclined to put in some claim for himself for priority for some suggestions that he has made—a claim which I feel inclined to call in question. I refer especially to the suggestion that *Glossina palpalis* is the carrier of the sleeping sickness Trypanosoma. It occurred to Dr. Sambon, as it did to everyone who knew the facts, that this might be so. The real interest in the matter is that Colonel Bruce found the *Glossina palpalis* where it was not previously known, and showed that its distribution coincides with that of sleeping sickness, and that it can and does carry the parasite, and he did this, of course, quite independently and without suggestion from Dr. Sambon.

Similarly, the suggestion that a change goes on in the Trypanosoma whilst in the interior of the Glossina —that there is some further development—is a suggestion which everybody who has ever heard of a parasite undergoing a change in the body of its host will, of course, entertain. It is of no use claiming priority for a platitude of that kind—the thing is to show that a change occurs. It is a possibility that observers who have Trypanosoma and Glossina under their observation are bound to entertain. But the suggestion that there is this possibility is not worth putting on record as a matter of priority—that is my opinion.

I think there is no doubt a very great deal more to be done in the study, not only of this particular Trypanosoma and its connection with sleeping sickness, but with regard to many other forms of the same kind. We must not be impatient. I think that a very extraordinary rapidity has been shown in the growth of our knowledge about the relation of Trypanosoma to sleeping sickness, when you remember that it was only in the beginning of last March that 70 per cent. of the patients were found to have the Trypanosoma in their cerebro-spinal fluid—only last March. There has not been much time lost in the investigation since then, and it is still in progress.

The President: I think the time has now arrived when I must consult the Society as to what they will do. We have every promise of an animated discussion on this very interesting subject; but we have nearly reached ten o'clock, and our rules will not allow us to go on after half-past. What I would submit is this, that we should adjourn the discussion—the greater part of it, with one exception, which I will name in a moment—to our next meeting on January 15th, in the hope that it will be convenient to Dr. Sambon to be with us again on that occasion; and that, in the meantime, we have the paper and so much of the discussion as has been already contributed, together with the exception that I am about to mention, set up in type; we should then be in a position to do more justice to the subject when we return to it.

I want to make one exception. We are honoured to-night with the presence of Dr. Brumpt, who has come from Paris; and, although we should be only too pleased to have Dr. Brumpt with us again at our next meeting, it is rather too much to ask of him to postpone what he has to say to us until then. I would, therefore, suggest that we should continue for a sufficient time after ten o'clock to hear what Dr. Brumpt may be able to tell us, and that we should then go in the next room and look at the specimens that have been prepared for us. Is it your pleasure that we adjourn the discussion, with that exception, to our next ordinary meeting on January 15th?

(The resolution was carried).

The President: Then, that I understand to be carried. Dr. Sambon's paper and the discussion which has already taken place, shall be put up in type; and may I ask those members and others who are present who desire to have copies of it, to communicate with the Honorary Secretary, Dr. Bulstrode?

Dr. E. Brumpt: Professor Ray Lankester is quite right in saying that the tsetse fly hypothesis is of little importance, as a consequence of Castellani's discovery, when based merely on the analogy of nagana. But there is a great difference between a mere suggestion and the arguments adduced by Dr. Sambon and myself.

Having noticed on the Congo, in December and January, 1902, that neither water, nor fish, nor manioc could be incriminated in the causation of sleeping sickness—because within the same region, whilst the inhabitants fed exactly on the same diet, but living close to a river, were decimated, those inhabiting the interior were spared; and that, on the other hand, the disease, though frequently imported to America, had not become acclimatised in that part of the world—the idea suggested itself of an intermediary host living by the water-side, and thus permitting the extension of the disease along the river margins. It is for this reason that, on hearing of Castellani's discovery, without the slightest hesitation I incriminated the tsetse flies, which alone could explain the epidemiology of the disease.

With Dr. Sambon and Sir Patrick Manson, I also consider that Colonel Bruce's experiments lack in scientific accuracy. There ought to have been control animals remaining immune after the bite of flies having fasted for a sufficiently long time, and others succumbing to the bites of infected flies. However, I consider Bruce's experiments of great interest; and were it possible to prove that the trypanosomes which developed in the monkeys were really those of sleeping sickness, Bruce would have solved one of the most important problems, especially as regards prophylaxis, which in

this malady, as in many other tropical diseases, has a far greater importance than treatment.

My own researches are due to the great discovery that Castellani made while in Uganda, on behalf of the Royal Society. I think the tsetse fly theory explains the whole epidemiology of sleeping sickness. All tsetse flies must be able to play a part in this disease, as well as in the other trypanosome diseases of Africa. These flies owe their great virulence to their voracity; to the habit of piercing the skin very frequently before settling definitely to feed; and, lastly, to the blandness of their gastric juices, which allow the trypanosomes to remain alive in their stomachs for a very long time.

The geographical distribution of *Glossina palpalis* is very wide, I found it on the River Omo, in the vicinity of Nimulé, and all along the Congo, from the source of the Onelle to Matadi.

Sir Patrick Manson, with perfectly scientific caution, has expressed the idea that the trypanosome and sleeping sickness may possibly represent two very different morbid entities, and that by inoculating the trypanosome one inoculates at the same time the germ of sleeping sickness. The experiments I made on animals in the Congo, and those I am now carrying out in Paris, together with Professor Wurtz, dispose, I think, of Manson's objection.

A monkey (*Macacus rhesus*) was inoculated with the blood from three cases of sleeping sickness, in the abdomen and beneath the skin of the thighs, as well as with the cerebro-spinal fluid of these patients into the vertebral canal. Repeated examinations during six weeks proved negative. The animal presented neither trypanosomes nor symptoms of sleeping sickness. The same monkey inoculated with the blood of another monkey which had been successfully inoculated, presented in eight days trypanosomes, and, simultaneously, symptoms of sleeping sickness.

The inoculations which remain negative as regards trypanosomes are equally negative as regards the symptoms peculiar to sleeping sickness.

CHAUVEL has come to the conclusion that meat eaters are most subject to appendicitis. Amongst Arabs appendicitis is almost unknown. Synder reports that in Teheran he treated in ten years but two cases of appendicitis amongst Persians. The Persians are not meat eaters; and one of the two cases Synder treated was a student recently returned from Paris, where he had to eat European food. Matignon, in Pekin, never saw a case of appendicitis amongst the Chinese during an experience extending over five years. In Brittany, Champonniere asserts that amongst religious communities where meat is forbidden appendicitis is unknown, and that amongst the general population, by whom little meat is consumed, he had only seen three cases of appendicitis during many years. Excess of meat in the diet would, from these observations, seem to point to beef as being the incriminating article of diet in causing appendicitis.

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THE

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MARCH 15, 1904.

IMPORTATION OF CHINESE INTO SOUTH AFRICA.

THE MEDICAL AND SANITARY ARRANGEMENTS.

THE introduction of Chinese labourers into South Africa seems to have been finally decided upon. The endeavour to stigmatise the importation of Chinamen to labour in South African mines as a "species of slavery" being more or less a political quibble does not concern us, but we should like to be assured that the medical and sanitary arrangements are being carried out in an efficient and considerate manner. That the sanitary measures will be efficient, so far as the Transvaal Government can make them, we may take for granted. There are several medical officers of Health in the Transvaal amply qualified to deal satisfactorily with matters of public sanitation, and provided the sanitary department is given a free hand we have no fear of failure. With the medical treatment, however, there may be more difficulty. By whom are the sick Chinamen to be treated—by British

or Chinese practitioners? and upon the decision of this point content or discontent will ensue. In China many hospitals are managed by British doctors, and the Chinese submit themselves to foreign treatment at times with readiness. But in almost every case a Chinese (native trained) doctor has been called in first, or is actually in attendance at the same time, for it is usually only necessity, owing to some surgical ailment, that compels a Chinaman to seek treatment at the hands of a foreign doctor. Many Chinese prefer their own doctors throughout their illness whatever its nature, and refuse foreign treatment altogether. This, it may be argued, is ignorance, but it cannot be overcome by ordinances nor by any form of cajolement. The position, then, must be accepted and dealt with. Should it happen that, say, during the third year of their stay in South Africa, the number of deaths in their quarters increase for any reason to an abnormal extent, the coolies may get the ridiculous notion that they are being "killed off" to save the expense of sending them back to China at the end of their contract time. This is no fanciful possibility and is only one of many stupid tales which are apt to be circulated in native camps when illness breaks out. How, then, are they to be dealt with? We would suggest the following steps be taken :—

(1) A British medical man who is familiar with the management of hospitals for Chinese in China should be placed in charge and granted supreme control of the internal economy of the hospital, and be the ultimate authority in matters of treatment, surgical operations, &c. He should be styled the Medical Superintendent. It is essential that this officer be able to speak the Mandarin dialect, or, if not, the dialect of the region from which the main number of the coolies likely to be engaged are to be drawn. The officer should also be able to read and write Chinese. There are several medical men qualified for this post now in England, and the Transvaal Government ought to see to it that their services are secured.

(2) In charge of each hospital or hospital block should be a British medical man with the title of Assistant Medical Superintendent. Preference should be given to medical men who are familiar with hospitals in China and who can speak Mandarin or other dialects.

(3) Attached to each large ward or to a group of wards should be a Chinaman, trained in western medicine at the College of Medicine for Chinese in Hong Kong (or at some other centre), with the title of Assistant Medical Officer. His duties would be to see that the treatment ordered was carried out, to keep notes, to see out-patients, to dress wounds, assist at operations, &c. A number of excellent men have been qualified at the College of Medicine for Chinese at Hong Kong during the past fifteen years, and the Government would do well to enlist their services at once.

(4) Nursing ought to be under the superintendence of (*a*) a matron—a British nurse who can speak Chinese. In connection with the Government Hospital, in Hong Kong, several of the sisters speak at least Cantonese, and their services would no doubt be available. (*b*) British nurses (Sisters) should be placed in charge of separate hospitals or hospital blocks. Sisters familiar with China and Chinese should be preferred. (*c*) For each large ward (or group of wards) a Eurasian (Anglo-Chinese) woman trained in hospital nursing should be obtained. Several have been trained as nurses in Hong Kong during recent years. (*d*) The rough ward work can be entrusted to Chinamen, who make excellent ward coolies with a little training.

(5) Native practitioners, so-called "Chinese Doctors," *i.e.*, "doctors" practising medicine according to Chinese methods, should be officially recognised by the Government authorities. To enforce all Chinamen to submit to foreign treatment would be unwise and might be attended with hardships to the sick, who would frequently prefer to suffer, or even to die, rather than take foreign medicine.

The Tung-Wa Hospital for Chinese in Hong Kong might be taken as a model to go by. At the Tung-Wa Hospital a British Medical Superintendent is in charge, and along with him a qualified Chinese medical man trained in Western medicine assists in the work of the hospital. Along with these also are native practitioners—"Chinese Doctors," and patients on admission select under which method of treatment they wish to be placed. The two systems are worked under the same roof, and there is no friction. This plan ought to be followed in Chinese hospitals in South Africa.

(6) The sanitary officers must be British officers, appointed by the Transvaal Government, and under them should be appointed sanitary inspectors. In Hong Kong are many British sanitary inspectors who can speak Chinese (Mandarin or other dialects), and it is from this body of men that South African Chinese hospitals should be supplied.

James Cantlie, M.B., F.R.C.S.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

In the advertisement columns of this issue of the Journal will be found the regulations framed by the University of Liverpool concerning the bestowal of a diploma in Tropical Medicine. In our last issue we drew attention to the diploma in Tropical Medicine to be granted by the University of Cambridge so that we have now two Universities at which candidates can "qualify" in Tropical Medicine. If report says true other Universities intend to issue diplomas in the same subject, so that the D.T.M. will become as much part and parcel of our University teaching and examination as the D.P.H. This is as it should be and all those directly interested in tropical diseases will welcome the innovation.

At the London School of Tropical Medicine for several sessions a systematic examination has been regularly held at the end of each session, and certificates granted to those who prove they possess sufficient knowledge of their subject. London and Liverpool in this country are the only Schools of Tropical Medicine at which it is possible to gain a clinical knowledge of tropical diseases, and although diplomas may multiply the schools cannot do so for lack of clinical material.

It will be noticed that the University of Liverpool propose to admit for examination only those students who have taken out a three months' course of study in Tropical Pathology and Hygiene in the University itself. It is doubtful, therefore, whether students who take out the Liverpool course will go to Cambridge for their diplomas, so that the chief source of candidates for the Cambridge diploma will presumably come from London.

The students at the London school have increased so rapidly that the laboratory accommodation has had to be doubled, and even now during the current session every seat in the laboratory is occupied. The photograph issued with this Journal testifies to the number of students at present attending the school, some thirty-five in all — by far the largest number during any session since the opening of the school.

It is apparent, therefore, that the neglect of this part of medical teaching and training which obtained until London and Liverpool organised schools of Tropical Medicine, is being atoned for; and the opposition which was placed in their way, by certain sections of the medical profession when these schools were first started, has been successfully overcome and the existence of the schools justified.

We subjoin the draft ordinance and regulations issued by the University of Liverpool.

Draft Ordinance for Diploma in Tropical Medicine.

(1) The University shall grant a Diploma in Tropical Medicine (written D.T.M.), which shall be awarded in pursuance of a resolution of Senate.

(2) The Diploma shall be awarded only to candidates who possess a qualification to practise Medicine recognised for this purpose by the University, and who present satisfactory certificates of having attended approved courses of study, and pass the prescribed examination.

(3) Regulations shall determine:—(*a*) The periods and courses of study; (*b*) the subjects of examination; (*c*) the fees to be paid for examination.

Draft Regulations for Diploma in Tropical Medicine.

(1) The examination for the Diploma shall be held three times a year, at the end of the autumn, Lent, and summer terms, and the first examination shall be held at the end of the summer term, 1904.

(2) Candidates before presenting themselves for the examination, and subsequent to having obtained the recognised qualification to practise medicine, shall have attended: (*a*) A three months' course of study in Tropical Pathology and Hygiene in the University; (*b*) a course of instruction in a hospital recognised by the University, in which beds are specially reserved for tropical diseases.

(3) The subjects of examination shall be: (*a*) Tropical Pathology and Parasitology; (*b*) Tropical and Applied Bacteriology; (*c*) Tropical Hygiene and Sanitation; (*d*) Tropical Medicine, including Ætiology, Symptoms, Diagnosis, and Treatment of Tropical Diseases.

(4) The fee for the examination for the Diploma shall be £5 5s.

THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

Letters have been received from the Governor of Lagos and Sir Ralph Moor, late High Commissioner for Southern Nigeria, on the subject of the value of the work done by the School in West Africa. The School is very much in need of money, as it is entirely dependent on the public for support. It is hoped that all interested in trade with tropical countries will see their way to subscribe to the funds, and any amount, however small, will be welcomed. The British Cotton Growing Association have just voted £50 towards the funds.

Sir William MacGregor, in the course of his letter, says that he has much pleasure in expressing his appreciation of the value of the work that can be done by a fully and properly equipped school of tropical medicine. "My attention was first directed to this question in 1874, when I found myself brought face to face with many diseases peculiar to the Tropics, and discovered that my knowledge of them, though I had been a diligent student at two great universities, was sadly deficient." A special school of tropical medicine, he continues, is precisely what is required to meet the defects in medical education that for so many years he felt to be really very serious. "I quite understand that all you require to make your School an institution of great national value, both from the point of view of humanity and of economic development, is money. To those merchants that are engaged in trade in our tropical countries, and that look forward beyond the present hour to the profitable extension of their business, the work of the School should specially appeal if it is clearly put before them." He concludes: "It is surely the duty of the Imperial and Colonial Governments, and also of the citizens of the Empire, to find the money needed for your purposes. To succeed you have only to show how good your cause is."

Sir Ralph Moor, after stating the pleasure it gives him to bear testimony to the excellent and effective work done and doing by the Liverpool School of Tropical Medicine, proceeds: "My service in West Africa dates from 1891, when the conditions of life and general circumstances as affecting health were very different to those of the present day. Efforts were then made by enthusiastic medical officers of the local staffs and administrators to grapple with those terrible foes to European life—tropical diseases—but the time of the former was too much occupied in dealing with the actual cases of disease to make systematic scientific research as to their causes and the means of prevention, and though the latter possibly succeeded in improving to some slight extent the hygienic and sanitary conditions, it was not until the establishment of the London and Liverpool Schools of Tropical Medicine in 1898-9, that thorough scientific investigation could be systematically undertaken, and means provided for special study and instruction in the subject. Since that time great strides have been made, and there are definite prospects that with a continuance of the work in the spirit in which it was inaugurated European life in the Tropics may be guarded against its most insidious foes, and that diseases peculiar to the natives of such regions may be successfully combated. . . . A great work has been commenced of undoubted importance to the world at large and to the British Empire . . . but the effort, while successful, leaves much still to be accomplished, and for lasting results the Schools would require to be made permanent."

Reviews.

The Medical Annual for 1904. Bristol: John Wright and Co., Stone Bridge, Bristol.

To *The Medical Annual*, now in the twenty-second year of its existence, we accord a hearty welcome. The divisions of the work are on the lines we have been made familiar with for many years, and we cannot see how the arrangement of the work could be improved upon. Part I is devoted to Materia Medica and Therapeutics, and some new and interesting forms of synthetic remedies are recorded; of these Helmitol, a urinary antiseptic, and Purgen, an innocuous purgative, are likely to come into frequent use. It is remarked that the Cacodylates have not fulfilled the promise they gave, and Arrhenal has proved inert. The Bilberry (*vaccinum myrtillus*) is being advocated as an efficient astringent and anti-fermentive; and in typhoid and chronic dysentery has been tried with apparent benefit. Cryogenine has been tried with good results, apparently, in France for the pyrexia of phthisis. For the first time Radium appears as a therapeutic agent, and its advent is ushered in with some promise of possible benefit.

The investigation of cancer, at present being conducted with all the talent and money this country can bring to bear upon the subject, holds the first place of interest in scientific medicine. A notification, issued by the investigators, that the method of division of carcinomatous cells is akin to that of sexual cells, and the possibility that human carcinoma may be communicated to animals, lead us to hope that the work being done may lead us to better prospects of cure or prophylaxis. The division of malignant diseases by Adami into lepidomata—"lining membrane tissue" growths, and hylomata—"pulp tissue" growths, is an advance upon the hitherto taught epi-, meso- and hypoblastic origins of malignancy. Under the heading Nervous Diseases the dietetic treatment of epilepsy is discussed; the latest eccentricity in this direction being the withdrawal of salt from the diet of patients. Lott's hyoscine treatment for the morphia habit is encouraging.

Tropical diseases occupy a prominent position in *The Medical Annual*, as the importance of the subject and the valuable additions to scientific medicine along this channel justify. Castellani's discovery as to the trypanosomal nature of sleeping sickness occupies a foremost place, and the recent additions to our knowledge of the disease, by Colonel Bruce, Dr. Nabarro and others, arrest attention. Anklyostomiasis, beri-beri,

craw-craw, lathyrism, leprosy, malaria, plague, yellow fever, &c., are dealt with in detail and their literature usefully summarised.

Throughout the book many useful diagrams are inserted; and perhaps none are more useful or better executed than those appertaining to the commoner infectious diseases:—Scarlatina, measles, small-pox, varicella, &c.; the plates showing the eruptions peculiar to each being accurate and realistic.

The part devoted to Sanitary Science and to New Appliances will be found of great help to those who practise their profession abroad, as they can be kept thereby informed of the most recent additions to our knowledge and to practice in these directions. *The Medical Annual* to practitioners in the Tropics is a necessity, and affords a comprehensive survey of modern medical opinion available at once for reference and guidance.

Notes and News.

Mosquitoes and Water Tanks on House Roofs.—The authorities in New York recommend that all water tanks on the roofs of houses should be covered with close wire netting. Kerosine is inadvisable, seeing that the water is for household purposes. The idea that mosquitoes do not fly high is disproved by the fact that they have been seen flying over some of the highest houses in New York.

The "Sanitas" Company, Limited. — At the Annual General Meeting of the "Sanitas" Company, the chairman directed attention to the "Pine-Oxygen" Treatment of Consumption and Lung and Throat Affections which had been elaborated by the Company. It was pointed out that this treatment of consumption is inexpensive and is within the reach of the very poor as well as the rich, while it does not necessitate residence abroad and obviates the rigours of the so-called open-air cure. Reference was also made to a new antiseptic dentifrice the Company had recently placed on the market known as "Zanol." That "Sanitas" maintains its position in the public esteem is practically shown by the fact that a $7\frac{1}{2}$ per cent. dividend was declared for the year 1903.

At the conference of the Röntgen Rays Society, Philadelphia, Dr. Henry K. Pancoast, Pennsylvania University, called attention to one remarkable effect of the X-rays upon negroes. In every case the part subjected to the rays had turned white, and after a year or more the skin had remained like that of a white man.

Sleeping Sickness.—Colonel David Bruce, F.R.S., delivered an address on Trypanosomes and Sleeping Sickness in Uganda, before the Liverpool Biological Society, on February 14th.

Sir Patrick Manson, F.R.S., delivered a lecture on Tropical Diseases, in the West African Committee Rooms, on March 8th. The Duke of Marlborough occupied the Chair.

Plague Disinfection. The Hydro-Carbon Process.—Dr. E. S. Chinoy gave an illustration of his method of disinfection by hydro-carbon on February 12th, at Ghorpuri. The quarters of the native railway staff, in some of which there have been plague cases, were submitted to the process. After the rooms had been cleared of their contents hydro-carbon was sprinkled on the floor with a watering can and a light was then thrust in on the end of a bamboo. The hydro-carbon at once burst into flame, and dense volumes of thick black smoke filled the room, destroying rats and other vermin. In the case of houses built of inflammable material the flame from the hydro-carbon can be diminished by the addition of water to the hydro-carbon before it is sprinkled. The heat given off is said to be greater than that from kerosine oil or other dessicating processes, while, as simplicity is its greatest recommendation, it takes only a few minutes to disinfect any house thoroughly. Hydro-carbon sprinkled on rats and insects killed them in a few minutes.

Hospitals on the Panama Canal.—In connection with the making of the Panama Canal, a large hospital is to be established at Colon with branch local hospitals as the work upon the Canal proceeds. The U.S. Public Health Marine Hospital Service has charge of the medical arrangements, and a number of medical officers are receiving special instruction in tropical diseases to enable them to cope with the diseases likely to be encountered.

Horse Sickness in Natal.—Dr. T. F. Elliott, of Verulam, Natal, in a paper recently read before the Manila Agricultural Association, states that he believes horse sickness to be mainly acute pneumonia, and due to working horses when suffering from fever. Dr. Watkins Pitchford had previously demonstrated that malaria was common in horses, but unless the horse is exposed to chills, or made to work when feverish, would not cause death. Dr. Elliott contends that the clinical thermometer should be much more extensively used in the stable than it is.

Treatment of Malarial Fever.—Dr. Carter, of Liverpool, in a paper read before the Liverpool Institution on February 18th, 1904, stated that in four cases of malarial fever in which the fever continued in spite of all ordinary remedies, Warburg's tincture had completely and apparently permanently brought relief of all the symptoms.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Beri-Beri.

Guerin, L. E. (*Le Caducée*, 1903, November 7, p. 290), gives his experience of a new treatment of beri-beri. Struck by the resemblance of the neuritis of beri-beri to that of syphilis, he tried the effect of intramuscular injections, 1 cc. of a 4 per cent. solution of hydrarg. perchlor. in Hayem's serum. The results were encouraging. Of 20 recorded cases 6 died, a death-rate of 33 per cent. as compared with 75 per. cent. heretofore. Four of these 6 cases were practically *in extremis* when treatment began. The remaining 14 recovered after from two to six injections, and those who could be watched remained well. Guérin asks for more observations as to the value of the treatment. In a note on the ætiology of the disease, Guérin says that in Madagascar he noted that those fed on decorticated rice from Indo-China suffered from the disease, while those who obtained their rice (non-decorticated rice) from the common village granaries, and decorticated it themselves as they needed it, escaped.

Durham, H. E. Some Notes on the Urine in Beri-beri. *British Medical Journal*, 1904, February 27th, p. 480.—Dr. Durham, whilst serving on the Beri-beri Commission of the London School of Tropical Medicine, made observations on the amount of urea, uric acid, kreatinin, purin bodies, and the several acids and salts present in the urine of beri-beri patients. His observations were carried out on Chinese, Tamils and Sikhs. Amongst Tamils and Sikhs beri-beri is a very rare disease. Dr. Durham's conclusions are as follows :—

The metabolism in beri-beri is seriously diminished. The amounts of urea, phosphoric and sulphuric acids may be greatly reduced. The conjugated sulphuric acids and the neutral sulphur do not appear to be proportionately diminished. The purin bodies do not seem to be of great interest in beri-beri; they were abundant in the critical urination of a highly œdematous case. None of the samples tested showed the slightest trace of albumen; uric acid and kreatinin were comparatively normal in amount. These facts would seem to indicate that the kidneys are not seriously at fault. From the marked diminution in the amount of phosphates and sulphates it would appear that the production is really at fault.

Cholera.

Prevalence of the Disease

The Philippines.—During December, 1903, there were reported 138 cases of cholera and 119 deaths from the disease. During the year 1903 no less than 28,891 deaths from cholera were reported.

Liver Abscess.

Vragnizan. Abscess of the Liver in Temperate Climates. *Il Polyclinico An.*, 9, f. 51.—In dealing with the subject of liver abscess in temperate climates Vragnizan states that, in whatever climate liver abscesses occur, the chief seat of origin is a lesion of the gastro-intestinal tract. In warm climates 5 per cent. of the total death-rates is due to abscess of the liver, whilst in temperate climates it is under 1·55 per cent. After pointing out the indefinite character of the signs and symptoms of pus in the liver, Vragnizan deals with the treatment of the ailment. He advocates laparotomy in two stages; first, exposing the abscess area by incision, and some ten days afterwards opening the abscess cavity itself.

Malaria.

Fraser, T. A. Treatment of Malarial Fever, *Amer. Pract. and News*, Louisville, 1903, October 13th.

Harris, S. Treatment of Remittent and Intermittent Fever, *Therap. Gaz.*, Detroit, 1904, January 15th.

Krauss, W., *ibid.*

McElroy, J. B., *ibid.*

Goltman, M. Few Remedies other than Quinine in the Treatment of Malaria, *ibid.*

West, H. A. Treatment of Malarial Fever, *ibid.*

Moore, J. T. Substitutes for Quinine in the Treatment of Malarial Fever.

McLaughlin, J. W. Treatment of Malarial Hæmoglobinuria with Quinine, *ibid.*

Shropshire, W. Use of Quinine in Malaria Hæmoglobinuria, *ibid.*

Red, S. C. Treatment of Malaria in Children, *ibid.*

Malaria and Cancer.

Cardamatis, I. Quel le rapport au paludisme avec les tumeurs malignes. *La Grèce Médicale*, 1904, February 1, p. 10.—Dr. Cardamatis states that the result of the inquiry in certain districts of Greece into the relation between paludism and malignancy has brought to light the following facts: (1) Where malaria is rife cancer is rare; (2) where cancer prevails malaria is uncommon or unknown; (3) inoculation of persons suffering from cancer with malaria has no effect in arresting the progress of the malignancy.

Mosquitoes in Cuba.

Pazos, J. H. (*Revista de Medicina Tropical*, 1904, January, vol. v., No. 1).—Dr. Pazos enumerates the mosquitoes of Cuba as follows :—

Culex pipiens, C. nigritulus, C. confirmatus, C. tæniorhynchus, C. sollicitans, C. jamaicensis, C. perturbans, C. nanus, C. humiles, C. scolasticus, C. consobrinus, Anopheles argyritarsis albipes (in this Anopheles the malaria parasite was found), A. crucians, A. stictotus, Cycloleppteron grabhamii, Psorophora howardii, Uranotænia lowii, Mansonia titillans, Wyeomyia smithii, Deinocerites cancer, Stegomyia fasciata.

Plague.

Prevalence of the Disease.

India.—During the weeks ending January 30th, February 6th and 13th, the deaths from plague in India numbered 23,203, 24,204 and 25,630 respectively.

Fourteenth Session—January to April, 1904.

M. E. Leicester, J. F. Stewart, H. C. Jeffreys, J. Eldon, A. R. J. Douglas, A. L. Hoops, C. T. Costello, Dr. Conyngham (Demonstrator), J. B. Cleland, B. Roe.

G. W. Guinness, H. D. Mackenzie, J. Kitchin, J. S. Macpherson, C.M.G., J. E. Brown, C. W. Somerville, A. E. Twyman, K. McGahey, R. Franco, F. W. Clark, J. C. Graham, B. Kaschkadamoff, G. F. Whyte.

Miss Smith, Mrs. Birkett, Prof. Simpson (Lecturer), Mr. Michelli (Secretary), A. Lyall, Sir Patrick Manson, K.C.M.G. (Lecturer), Lieut.-Col. Thomson, I.M.S., Dr. Sambon (Lecturer), Miss Benson, Miss Lenwood, Miss McDougall.

Dr. Brown (Senior House Surgeon). Dr. Low (Medical Superintendent), H. G. McKinney. J. A. Thomson. A. M. De Saram.

Absent—G. Park Ross, W. M. Eaton, A. P. Laycock.

Bale and Danielsson, Ltd., London.

Cape Colony.—No fresh cases of plague nor any deaths from the disease were reported from any part of Cape Colony during the weeks ending February 6th and 13th.

Mauritius.—During the weeks ending February 25th and March 3rd the fresh cases of plague reported were 3 and 6 respectively, and 2 and 5 deaths from the disease.

The Philippines.—During 1903 the deaths from plague numbered 176.

Egypt.—At Alexandria, on February 8th, 1 case of plague was reported.

Brazil.—At Rio Grande 1 case of plague was reported during the first week of February.

San Francisco.—On January 11th 1 death from plague occurred, and on January 13th 1 death.

Sleeping Sickness.

Wurtz. Sleeping Sickness. *Semaine Médicale*, 1903, December 23.—In his lecture on the cases of sleeping sickness in Paris, Wurtz stated (1) that the tsetse fly, being the transmitting agent in the disease, must be exterminated; (2) that healthy persons must be protected; (3) that tsetse flies must not be allowed to bite persons suffering from the disease; (4) that an endeavour should be made to find a bactericide for the germ in the blood and cerebro-spinal fluid of the infected.

Yellow Fever.

Finlay, C. J. New Aspects of Yellow Fever Etiology (*Journ. American Med. Association*, 1904, Feb. 23.—In a paper read before the meeting of the American Public Health Association, Oct. 28th, 1903, Dr. Carlos J. Finlay comes to the following conclusions:—

The minimum number of days (estimated at ten or twelve) which must elapse, after the stegomyia has bitten a yellow fever patient, before the infected insect is able to inoculate the disease through its bites, must represent a series of transformations in the body of the contaminated mosquito, including:—

(*a*) Introduction of young sporozoits sucked up with the blood of the patient.

(*b*) Growth of the sporozoits to adult age.

(*c*) Formation of schizonts and merozoits.

(*d*) Formation of gametes.

While in the body of the non-immune, counting from the moment of his inoculation by the infected stegomyia, the following stages are likely to take place during the period of incubation:—

(*a*) Localisation of the gametes in appropriate sites.

(*b*) Fecundation of the macrogametes by the microgametes of the yellow fever germ.

(*c*) Formation of the oökinet and development of the oöcyst in appropriate cells (endothelial?)

(*d*) Discharge of free sporozoits of yellow fever into the circulating blood (perhaps too small to be recognised with the microscope).

(*e*) Development of the toxæmic symptoms characteristic of the invasion of yellow fever in the inoculated non-immune.

Dr. Finlay's theory regarding the life cycle of the yellow fever germ was published in the *Revista de Medicina Tropical Havannah*, in April, 1903. He is of opinion that the specific germ of yellow fever has its permanent host in the mosquito, and that they undergo sexual reproduction in the human blood. This, it will be noted, is the reverse of what obtains in malaria where the sexual reproduction takes place in the mosquito itself; in other words, that in yellow fever the mosquito is the permanent host, in malaria it is man. In the body of the mosquito, therefore, the germ of yellow fever must be sought, and in the *Medical Record* of August 15th and 22nd, 1903, a parasite in the mosquito capable of producing yellow fever is described by Parker and Beyer. In the *Lancet* of August 29th, 1904, J. B. Tombleson describes a bacillus in the blood in cases of yellow fever.

Paschal, F. The Differential Diagnosis between Yellow Fever, Dengue Fever, Malarial Fever and Acute Yellow Atrophy of the Liver.—*Texas Medical Journal*, January, 1904.

Literary References.

TROPICAL DISEASES.

FILARIASIS (UNCINARIASIS).

Ashford, B. K. Filariasis in Porto Rico, *Med. Rec.*, New York, 1903, vol. lxiv., p. 724.

and **King, W. W.** A Study of Uncinariasis in Porto Rico, *Amer. Med.*, Philadelphia, 1903, vol. vi., p. 391.

Bancroft, T. L. Notes on Filaria and Mosquitoes, *Australas. Med. Gaz.*, Sydney, 1903, vol. xxii., p. 257.

Bastian, H. C. The Anatomical Characters of the so-called Filaria Perstans, and on the Mode of Infection thereby, *Lancet*, January 30th, p. 286, and March 5th, p. 643, 1904.

Béclère, A. Note sur un cas de filaire de Médine et sur un nouveau procédé d'extraction de ce parasite, *Bull. et mém. Soc. méd. d. hôp. de Paris*, 1903, 3 s., vol. xx., p. 867.

Boggs, T. R. Uncinariasis: Report of a Case of Infection with the American Species, *Johns Hopkins Hosp. Bull.*, Baltimore, 1903, vol. xiv., p. 232.

Brown, F. T. A Case of Filaria Bancrofti, *Med. News*, New York, 1903, vol. lxxxii., p. 765.

Calvert, J. T. Note on the Prevalence of Elephantiasis, Filariasis, and Hydrocele amongst Prisoners in the Cuttack District Jail, *Ind. Med. Gaz.*, Calcutta, 1903, vol. xxxviii., p. 180.

Capps, J. A. Uncinariasis or Ankylostomiasis, with the Report of a Case, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xl., p. 28.

Claytor, T. A. The Treatment of Uncinariasis, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli., p. 308.

Daniels, C. W. Adult Form of Filaria Demarquaii, *Journ. Trop. Med.*, London, 1902, vol. v., p. 357.

Elliot, J. H. A Preliminary Note on the Occurrence of a Filaria in the Crow, *Biological Bull.*, Lancaster, Pa., 1902-3, vol. iv., p. 64.

Evans, G. H. Uncinariasis: Report of a Case, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xl., p. 990.

Hara. Zur symptomatologie der Filaria und Anchylostomum-Krankheit, *Mitt. d. Med. Gesellsch. zu Tokyo*, 1903, vol. xvii., p. 139.

Harris, H. F. Uncinariasis (Ankylostomiasis); its Frequency and Importance in the Southern States, *Atlanta Journ. Rec. Med.*, 1903-4, vol. v., p. 133.

Johnstone, Mary M. S. Report of a Case of Elephantiasis due to the Filaria Sanguinis Hominis Nocturna, *Chicago M. Recorder*, 1903, vol. xxv., p. 34.

Lang and **Noc**. Les Filaires en Nouvelle Calédonie, *Arch. de Parasitol.*, Paris, 1903, vol. vii., p. 377.

Lemann, I. I. Importance of Uncinariasis to the Southern Practitioner, *Mississippi Med. Rec.*, Vicksburg, 1903, vol. iii., p. 211.

Lockwood, W. F. A Case of Filariasis observed in Maryland, *Maryland Med. Journ.*, Baltimore, 1903, vol. xlvi., p. 367.

Low, G. C. Filaria Perstans, *Journ. Trop. Med.*, London, 1903, vol. vi., pp. 180-198.

Filaria Perstans, *Brit. Med. Journ.*, London, 1903, vol. i., p. 722.

Manson, Sir P. The Life Span of Filaria Medinensis, *Brit. Med. Journ.*, London, 1903, vol. ii., p. 10.

Martini, E. Ueber eine Filaria sanguinis equi, *Ztschr. f. Hyg. u. Infectionskrankh.*, Leipsig, 1903, vol. xlii., p. 341.

Moeller, G. A. Uncinariasis, *Texas Med. News*, Austin, January, 1904.

Notes sur la Filariose de Médine au Soudan, *Gaz. hebd. d. sc. méd. de Bordeaux*, 1903, vol. xxiv., p. 246.

Plasencia, L. Contribución al estudio de la filariosis en Cuba, *Rev. de med. trop.*, Habana, 1903, vol. iv., p. 17.

Polverini, G. Intorno ad un caso di Filaria Medinensis, *Clin. mod.*, Pisa, 1903, vol. ix., p. 100.

Powell, A. A Species of Blood Filaria, probably hitherto Undescribed, *Brit. Med. Journ.*, London, 1903, vol. i., p. 1145.

Remlinger and **Hodara - Bey, M.** Deux cas de chylurie filarienne, *Arch. de Parasitol.*, Paris, 1902, vol. vi., p. 574.

Repp, J. J. Peritoneal Filariasis in the Horse, *Amer. Vet. Review*, New York, 1903-4, vol. xxvii., p. 219.

Sicard, J. A., and **Blais**. Eosinophilie dans la filariose humaine, *Compt. rend. Soc. de biol.*, Paris, 1902, 11 s., vol. iv., p. 1427.

Smith, C. A. Uncinariasis in the South ; Further Observations, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli., p. 709.

Spivak, C. D. Uncinaria Americana, an Intestinal Parasite ; Exhibitions of Specimens of the Parasite and its Ova, *Denver Med. Times*, 1902-3, vol. xxii., p. 583.

Stiles, C. W. Hookworm Disease (Uncinariasis), a newly-recognised factor in American Anæmias, *Brooklyn Med. Journ.*, 1903, vol. xvii., p. 51.

The Prevalence and Geographical Distribution of Hookworm Disease (Uncinariasis) in the United States, *Buffalo Med. Journ.*, 1902-3, vol. xlii., p. 517.

Stone, W. R. The Geographic Distribution of Uncinariasis in the United States, *Med. News*, New York, 1903, vol. lxxxii., p. 680.

Tribondeau. Note sur la filaire aux îles de la Société, *Compt. rend. Soc. de biol.*, Paris, 1903, vol. lv., p. 996.

Warfield, L. M. Observations on Uncinariasis (Ankylostomiasis), *Amer. Medicine*, January 9th, 1904.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
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Original Communications.

ON THE ETIOLOGY OF SCURVY.[1]

By Myer Coplans, M.B.

Late Civil Surgeon attached R.A.M.C., South Africa.

Mr. President and Gentlemen,—As I have not dealt at all fully with the clinical aspect of the cases referred to in this paper, I may perhaps state here that the cases conformed in every particular to what, I take it, would be regarded as typical scurvy. As to this no question has been raised, but I make the statement with the view of clearing up any doubts which may have arisen on this point in the minds of those who have already read the paper.

Briefly, these cases of scurvy presented during life spongy, bleeding gums, anæmia, breathlessness on exertion, followed later on by lameness, associated with synovitis in the joints and hæmorrhages, with brawny indurated swellings in one or both of the lower limbs. The urine was slightly acid, the blood showed marked poikilocytosis in the red discs. *There were no nervous lesions.* Death took place from cardiac failure usually, and *post mortem* the blood was fluid, there were subserous, submucous, and subpleural hæmorrhages; the heart was thin and pale, and the right side dilated. There was excess of serous fluid in the pericardium. The body was well nourished.

Further, I wish to explain my attitude in the matter. I have approached the subject with a perfectly open mind, and before the Transvaal experience I had no special acquaintance with scurvy. After studying the outbreak I endeavoured to explain it by the current views as to the causation of the disease—but failed. I am therefore venturing to submit this thesis to the judgment of this Society.

I would ask you to approach the subject "*de novo*"—with open minds—setting aside for the present all historical writings and sayings on the matter, treating this outbreak of the disease as an entity, and in particular, bearing in mind the fact that the question of the anti-scorbutic value of any food is not being raised.

I propose to lay before you some evidence pointing to the fact that the condition known as scurvy in adults is not brought about by the absence of any particular kind of food from the dietary, but is more probably a specific infection of bacterial origin.

Towards the close of the Boer War, in May, 1902, there was presented the unusual spectacle in the Transvaal and Orange River Colonies of lands devastated by fire, devoid of farms, of crops and of cattle, with the entire human population—natives and Europeans, combatants and non-combatants—gathered together into a series of small communities or units, of fixed location and definite occupation, under supreme military control. Each of these units was supplied by the military authorities with food, this food being mainly imported from over-sea, and transported up-country along closely-guarded railway tracks.

Thus every individual in every community was definitely rationed. Except in the few towns that still remained undestroyed, it was found impossible to obtain food of any description except that imported. For the inhabitants remaining in these undestroyed towns there were provision stores, which supplied goods at fixed prices, and in definite quantities only. The shops, the inhabitants, and their houses were under close military supervision by day and night.

Solely for the use of the military classes there were instituted the Field-force canteens, which supplied additional articles of food on payment. These canteens, though private ventures, were also under military control, and the demand from them by the troops for goods was nearly always in excess of their power to supply. The goods sold at these canteens were principally imported preserved foods; and thus all in British military employ were enabled in some measure to supplement their regular rations.

All other classes were dependent entirely on the Government for rations; and at this time every individual in the country could, with some degree of certainty, be accounted for officially as to dwelling place, employment, and amount and nature of food consumed. From the military organisation of affairs, and division of the inhabitants into units, no individual non-combatant could fare better or worse in his food supply than the remaining members of his own unit.

Thus all burgher camp inhabitants participated equally in the general food supply for the burgher camp population. So with the natives attached to the British Army and the regular European troops. For each of them, as a class, there was a definite food supply per individual, based on the general store of food in the country, and issued under the control of the military authorities. Sometimes the burgher camps fared better than the troops; at other times the positions were reversed.

The evidence supporting the contention that scurvy is caused by a specific infection is derived from two sources—viz., study of the epidemic behaviour of the disease, and study of its clinical features.

The incidence of scurvy in the Eastern Transvaal will be considered in the following units:—

(1) The burgher concentration camps.

(2) The European soldiers.

(3) African natives attached to the British Army.

(4) African natives attached to the Civilian Repatriation Departments.

With regard to Class 1.—The burgher camps under special observation were those situated at Middelberg Standerton, and Volkrust.

Each camp numbered about 5,000 inhabitants, of whom 48 per cent. were children under 12 years of age. The remainder were classed as adults, male and female, and were in the proportion of one to three. The inhabitants lived in tents, which were regularly arranged at wide intervals on sloping, well-drained soil, and each camp possessed its own internal medical and educational organisations. Every camp was surrounded by barbed wire fencing, and was closely guarded, and as

[1] Read before the Epidemiological Society, February 19th, 1904

ingress and egress were privileges subject to military control, each camp was in a sense an open prison. No food could reach the camps, or be distributed to the inhabitants, except with official sanction. A definite scale of food, varying with the age of the individual, was laid down and rigorously adhered to, In each camp were separate quarters for the native camp inhabitants. These natives, who likewise had fixed rations, acted chiefly as servants to the members of the camp staffs and to the Dutch inhabitants. They averaged 150 per 5,000 whites.

The incidence of scurvy *at the burgher camps*, considered in detail, was as follows :—

(1) In the camp at Standerton, between March, 1901, and January, 1903, there were no cases of scurvy.

(2) In the camp at Volkrust, similar in every respect to that at Standerton, and over a similar period, there were no cases of scurvy.

(3) In the camp at Middelberg, which was slightly larger than that at Standerton, there were 100 cases among Europeans and 1 case among natives, over a similar period.

This outbreak of scurvy among adults at Middelberg, which occurred during December, 1901, and January, 1902, under a dietary similar in all respects to that in use at the camps at Standerton and Volkrust, immediately lends colour to the suggestion that the cause of scurvy is to be found in conditions other than those associated with food. The inhabitants of these camps had no occupation other than their domestic duties.

Secondly, with regard to European Soldiers.—The district under inspection as to the prevalence of scurvy among Europeans in British military employ was that of Standerton. All the sick within a radius of 40 miles were received into No. 17 General Hospital. This hospital had advanced up-country through Natal with General Buller's army, being known as No. 4 Stationary Hospital, and finally found a resting place at Standerton as No. 17 General Hospital. It comprised 600 beds for Europeans, and a variable number—from 30 to 70—for natives in military employ.

Between December, 1899, and January, 1903, 22,000 European patients were admitted. This number included 100 sick Boer prisoners of war, 40 sailors of the Royal Navy, and 160 civilians in Government employment.

There was not a single case of scurvy among these admissions. Between March, 1902, and February, 1903, 3,000 soldiers around Standerton were examined while at their duties, and only one was found affected with scurvy. This was a private of the Scottish Rifles on detached duty, living with, and having charge of, the transport section of the native sanitary corps; and to his case further reference will be made subsequently.

Scurvy, therefore, with this single exception, was non-existent among European troops and Europeans in military employ in and around Standerton.

Thirdly, with regard to the Natives in Military Employ in and around Standerton, the evidence is derived from two sources :—

(1) The statistics of the native Military Hospital attached to No. 17 General Hospital.

(2) A repeated examination of the natives in military employ in the Standerton district.

Examination of the hospital record of admissions of natives shows that the first case of scurvy admitted occurred in November, 1901. This was the first out of a total of 300 admissions for all causes. Among these 300, however, were 18 cases admitted for indefinite symptoms, such as debility, rheumatism, inflamed connective tissue, and periostitis. These may possibly have been cases of scurvy. No further cases of scurvy were admitted between November, 1901, and April, 1902. In May, the last month of the war, 8 cases of scurvy were admitted —6 from the Army Service Corps Transport Section on May 1st, and 2 from the Sick Horse and Remount Depôts a few days later. In addition, there were 27 cases, diagnosable by their symptoms only, of the character above mentioned. The total admissions to hospital from all causes between November, 1901, and May 31st, 1902, was 390.

Definite scurvy, therefore, formed 2 per cent. of the total admissions, and doubtful scurvy 7 per cent. Between June 1st and September 30th, 1902, there were 193 admissions, including 22 cases of definite scurvy and 20 doubtful cases, *i.e.*, 11 per cent. and 10 per cent. respectively, of total admissions.

The last period noted is from October, 1902, to February, 1903. The total admissions numbered 86. Of these scurvy accounted for 24, and there was one doubtful case. Definite scurvy, therefore, formed 28½ per cent. of all cases admitted during this period.

The following is a summary of the foregoing facts :—

Between January, 1901, and February, 1903, 970 natives were admitted to the Military Hospital. Before May, 1902, definite scurvy was practically absent. During this month, after a total admission of 600 patients, 8 definite cases of the disease occurred and were admitted to hospital. From this month onward, until February 7th, 1903, the prevalence of scurvy among the hospital admissions gradually increased from 2 per cent. to 28½ per cent. At the same time the total admissions for dysentery, diarrhœa and enteric fever fell considerably, and the monthly admissions fell from an average of 57 to 21. It is to be remarked that this notable increase in the percentage of admissions of scurvy cases occurred on the cessation of hostilities, when the natives and troops to whom they were attached became stationary, and concentrated in fixed camps in and around Standerton. It is of further importance to note that during the latter portion of the period under consideration, when scurvy was most prevalent, all restrictions in food had been withdrawn; and also all cases admitted came from units stationed in Standerton town.

Such is the information gleaned from the hospital statistics.

The increasing proportion of scurvy cases admitted to the native Military Hospital induced one to make a general inspection of all natives in military employ in and around Standerton. The men were examined in their own quarters while on duty. Outside Standerton, between March and July, 1902, before the troops and attached natives were concentrated in the towns, no signs of scurvy were found. After the concentra-

tion in Standerton, natives were again examined, and the following results obtained. Those inspected were of two classes, the labourers and the mule-drivers.

(1) The labourers were divided into the Native Labour Corps and the Native Sanitary Corps. In the Labour Corps there were 117 men employed, and 16 per cent. were affected. In the Sanitary Corps 37 men were employed, and 76 per cent. were affected.

(2) The mule-drivers were all attached nominally to regular regiments or corps.

The following is a brief statement of the incidence of scurvy among them :—

(1) Attached to Pom-pom Section, 8 men. None affected.

(2) Attached to Mounted Troops, 67 men. 22 per cent. affected.

(3) Attached to Army Service Corps, Transport Section, 400 men. 32 per cent. affected.

(4) Detachment in charge of Officers' Carts, Army Service Corps, 9 men. None affected.

(5) Detachment employed as Police in Army Service Corps camp, 8 men. Four affected.

To return to a consideration of the Native Labour and Native Sanitary Corps. These two units received exactly the same rations, which consisted of mealy meal 2¼ lbs. daily, and meat 1 lb. weekly. The Labour Corps had 16 per cent. affected; their work was that of heavy goods porterage at the railway station. On the other hand, the Sanitary Corps had 76 per cent. affected, and their work was that of gathering together the carcases of animals that had died during the war around Standerton, and burying them in pits. The eight men who were occupied in transporting the carcases by mule waggons to the burial pits were every one of them affected with scurvy, as was also the European soldier in charge of the transport party. This is the case referred to previously as the only European found affected with scurvy at Standerton. His food was the same as that of the other soldiers at Standerton, and was totally different from the food of the natives of the Sanitary Corps. Although he was granted the use of a separate tent, which stood side by side with those occupied by the Sanitary Corps natives, he, however, spent the whole of his leisure time with these natives, and associated intimately with them. The natives of this corps had been recruited but three months previously, direct from their homes, and had come in perfect health. It is a noteworthy fact that the head native of this gang occupied, with his family of six, a tent a short distance apart from the others, and although their diet was similar to that of the corps, none of them were affected with scurvy. The greater cleanliness of this tent, as compared with the others, was also striking.

The marked contrast in the prevalence of scurvy in these two units, namely, 76 per cent. in the scavengers and 16 per cent. in the porters, under precisely the same dietary, again points to a factor other than food as the prime cause of the disease. Nor can it be entirely the unwholesomeness of the work of the Sanitary Corps, because other diseases due to insanitary conditions, such as diarrhœa, were markedly absent. It may be further mentioned that, although these two units, the scavengers and the porters, occupied separate quarters within a few hundred yards of one another, they were practically on one enclosed piece of land.

Next, with regard to the mule-drivers. Their food was exactly the same as that of the ordinary European soldiers, with the exception of the lime-juice ration.

The Cavalry, Artillery and Pom-pom Section natives lived in tents in the same camps as the European Cavalry and Artillery. Their surroundings were, therefore, comparatively cleanly, and the incidence of scurvy varied from total absence in the Pom-pom Section to 22 per cent. in the Cavalry natives. On the other hand, the natives of the Army Service Corps, who lived in a large encampment by themselves, and whose tents were uncleanly and compared unfavourably with those of the Cavalry and Artillery natives, had 32 per cent. affected. Of the 400 men examined belonging to this division, 200 were leaving for their homes on the following day, their contract period of service having expired. They complained of feeling too ill to work, and refused to sign afresh any contracts for further employment. Quite one-half of this number were suffering from scurvy. It will be said, however, that the regular troops were supplied with lime-juice, but not the natives. It may be pointed out, in return, that lime-juice was offered to all military natives in December, 1902, and the prevalence of scurvy was greatest in 1903. It must further be stated that the lime-juice was left severely alone by nine out of every ten men, troops and natives alike. This raw lime-juice was too acrid, too raw, and gave severe colic to many. It could not possibly be drunk without sugar, and sugar was too valuable for other purposes to be taken to improve extremely unpalatable lime-juice. The ultimate result was that the natives attached to these corps and living with them had precisely the same dieting as the English troops. Still, only the natives were found affected by scurvy, and that corps of natives (the Army Service Corps) was most affected, whose camp was most unclean and least under direct military supervision.

Here, again, proof seems to be wanting that the food factor is the cause of scurvy. In this connection, further, the condition of affairs in the 19th Hussars is interesting. One squadron of the 670 Europeans forming the regiment were buying fresh vegetables regularly in addition to their ordinary rations. The remaining two squadrons subsisted on the rations issued: there was no sign of scurvy in either Section.

Fourthly, the last unit in which inquiry was made as to the incidence of scurvy, comprised 900 natives of Africa employed as drivers and leaders of mules by the Repatriation Department—a civilian organisation inaugurated on the cessation of hostilities. The sick of this corps were treated at the hospital in the Burgher Camp, Standerton, when too ill to look after themselves; but when merely unable to work were kept in sick detention tents close by their regular quarters.

Between August, 1902, and February, 1903, the Department being in full working order, 80 cases of all diseases were admitted to the hospital. Of these 50, or 62 per cent., were cases of scurvy. In February, 1903, a final inspection of the natives of this Department was made. Of the 900 employed 500 were exam-

ined, and 252 were found to be affected, *i.e.*, 50 per cent.

Of the 14 cases in hospital 12 were scurvy; of the 14 in the sick detention tents 12 were scurvy. In connection with this inspection, the diagnosis of the cases was confirmed by the senior medical officer of the Burgher Camp, Standerton (Dr. Alexander).

Again the feature to be noted is, that the food of these natives was quite as plentiful (in some respects more so) as that supplied to the natives under military control; but on the other hand, their camp was the least tidy and clean of all at Standerton. The tents were overcrowded, closely packed together, and arranged with a total disregard for sanitation. The area of this camp, containing 900 men, was only one-third in extent of that occupied by the Scottish Rifles, who numbered 500. The statistics of the sick in detention tents were not kept, or the tale would have appeared heavier. Although the natives of the Repatriation Department did not outnumber by any means the natives in military employ, the incidence of scurvy amongst them was the heaviest of all native units at Standerton. A consideration of this fact, then, that this body of natives, with the best and most liberal food supply in the town, had the heaviest incidence of scurvy, again points to the conclusion that food as a factor in the production of the disease must be eliminated.

Further evidence against food being the prime cause of the condition is afforded by clinical study of the cases—more especially by consideration of the mode of onset and the results of treatment. All these cases of scurvy commenced as an inflammation of the gums, and the general symptoms followed at varying intervals, but always secondarily to the gum condition.

Improvement or the reverse followed *pari passu* with improvement or aggravation of the gum condition. This inflammation of the gums occurred in all cases, without exception, and in a definite manner. The process was as follows: Around the tooth and next to the gum was first noticed a collection of food. The gum-edge nearest this aggregation soon became of a deeper red tint. This deeper tinted area spread rapidly, but in the early stage was always separated from the healthy gum by a definite violet-mauve demarcation line. In a few days the whole of the gums, both internally and externally, became involved in the inflammatory process, and areas devoid of teeth which had hitherto been healthy were now affected. At this stage the affected tissues were deep red in colour, soft, swollen, and compressible, tender, and bled easily on pressure. In a day or so the gums became easily separable from the teeth; and deep down, between the gums and the teeth, definite masses of a cream-cheesy consistency and colour could be seen and removed. These masses, on microscopic examination, were found to consist of pus cells, numerous micro-organisms of various kinds, and food *débris*. At this stage there were no constitutional symptoms, nor could any changes be detected in the cardio-vascular system. These conditions developed later at varying intervals, and it was found that they did not develop when means were adopted to improve the gum condition. Moreover, in cases in which the general disturbance was present, there could be no ultimate recovery without a prior return of the gum condition to the normal. The method of treatment adopted, therefore, consisted of rest in the open air, isolation from previous surroundings, coupled with rigorous and frequent mouth antisepsis, care being taken to remove the cheesy masses mentioned above. The rate of general improvement and return of the gums to the normal condition was in direct proportion to the amount and efficiency of the antiseptic treatment employed for the mouth.

The fact that these cases when seen early could be completely cured by this treatment alone—with, be it noted, no alteration of any sort in the diet—argues directly against the diet being the prime cause of the condition. Further, the value of local treatment for the mouth condition is emphasised by a comparison of the results of treatment in advanced cases by (1) local plus constitutional treatment, and (2) by constitutional treatment alone. For local plus constitutional treatment the average length of residence in hospital was from twenty to thirty days; but from constitutional treatment alone from sixty to ninety days. It is also interesting to note that in advanced cases in which mouth antisepsis was employed there was little or no pyrexia, but that periods of pyrexia were a feature of similar cases in which this treatment was omitted.

These clinical facts, therefore, seem to suggest that the condition is not due to the food, but is one caused by an infection through the gums and mouth. Whether the system is infected directly through the gums or through the swallowed saliva after the gum condition has developed cannot be readily determined.

Further, that the condition was found to prevail only among natives concentrated at Standerton, and then only in direct proportion to the absence of discipline and European habits of cleanliness, points to the fact that the unchecked habits of natives must in some measure either account for, or at least increase, the liability to the disease.

The native seldom used soap, and rarely did they wash their hands or faces; and a large proportion, though they wore little or no clothing, were extremely verminous. This clothing was second-hand, and usually consisted of one or more cast-off European garments, which were very filthy and seldom washed. They rarely washed their blankets, and never swept out their tents. They had common eating and drinking utensils, and frequently several ate out of one dish at the same time. Though dental caries is less common among them than among Europeans, they rarely washed out their mouths. The majority of the natives chewed tobacco, "black Cavendish" being easily obtainable through the troops; and not infrequently they passed the half-chewed "quids" from one to the other for further use. With this chewing there was expectoration free and plentiful—a habit found impossible to repress. Then they used mouth-organs and similar instruments in profusion, passing them from one to the other. They left both half-eaten food and food in preparation lying about on the ground, both inside and outside of their tents. Moreover, the tents were always in use, and crowded during their

off-duty time. Altogether, these habits formed an excellent basis for the conveyance of any mouth-to-mouth infection.

To sum up—

(1) The outbreak at the Burgher Camp, Middelberg, among Europeans and Natives, was attributed to the nature of the food supplied. It was noticeable that the European sufferers consisted mainly of those persons who from advancing years were unable to fend for themselves, and of those who, suffering from mental depression at the prolonged separation from relatives, neglected to obey even the ordinary rules of personal cleanliness. Moreover, the cause could not have been in the food, seeing that food of precisely similar nature was in use at Standerton and Volkrust, and yet scurvy was entirely absent from these latter camps. But, on the other hand, the sanitary condition of the Middelberg camps was much inferior to that of the other camps named. At this time a determined effort was made to improve the sanitary condition of camps. Soap and fuel were ordered to be issued in unlimited quantities, whereas previously they had been supplied in restricted amounts. These articles were included in a new ration scale which was also introduced at this time. Scurvy now disappeared from Middelberg. It may be said that the cessation of the disease was due to the new diet provided; but the total absence of scurvy under the old dietary scale at Standerton and Volkrust is entirely opposed to this view, and it is remarkable that the disappearance of the disease was as markedly coincident with improved personal cleanliness in the Middelberg camps as with the change in diet.

(2) Scurvy did not appear in the district of Standerton until the last month of the war, when the mobile troops became stationary and concentrated into large units. Further, it continued with increasing severity among these units when war had ceased, and when restrictions in the way of purchasing extra food had been withdrawn. After the war all classes were free to supplement their Government rations by purchasing fruit and vegetables at the various provision stores in the town. Special enquiry was made among those showing well-marked signs of the disease, as to whether or no fresh fruit or fresh vegetables had formed part of the dietary—in addition to the official supply of rations. In many cases there was abundant satisfactory evidence forthcoming to the effect that the sufferers were purchasing and consuming fresh pineapples, fresh bananas, or fresh melons and other vegetables imported direct from Natal. It is highly probable that these natives, whose daily pay always equalled, and in many cases exceeded that of the English soldier, both purchased regularly a larger quantity of fresh vegetables or fruit than was the custom of our British European troops.

(3) The only European affected at Standerton was attached to the Native Sanitary Corps—a unit of which 76 per cent. suffered from scurvy. Let it be noted, however, that this European lived with these natives. His diet was similar to that of the other European soldiers at Standerton, but he spent the whole of his time in the company of these scavengers; and by reason of this mode of life was freely exposed to any mouth-to-mouth infection. On the other hand, the family of the head native, consisting of six individuals, was unaffected by scurvy. Their dietary was that of the Sanitary Corps, but they lived in a tent at a short distance from the scavengers' encampment, and their standard of personal cleanliness was of a high order.

The varying incidence in the two units—the Native Labour Corps and the Native Sanitary Corps—namely, 16 per cent. in the former and 76 per cent. in the latter, cannot be explained by the food alone, since both units were on precisely the same diet.

(4) With regard to the other natives inspected at Standerton, not one of the 150 employed at the burgher camp as servants to the European camp staff was found affected; nor did natives employed as domestic servants in the European military messes, shops, or households in the town show signs of the disease; but in the remaining units, both civil and military, scurvy prevailed directly as the filthy habits of the natives were allowed to go unchecked by direct European control.

(5) Of those cases of scurvy admitted to the Military Hospital, Standerton, 12 per cent. died. Of those who recovered, 90 per cent. went back to their former duties, their former dietaries, and their former surroundings; and though they lived among men afflicted with scurvy, yet the hospital records do not show a single instance of a case recovered from scurvy seeking readmission for a recurrence of the disease.

These facts, therefore, concerning the incidence of scurvy in the various bodies of individuals, seem to be against the contention that food is the sole cause of the disease; and, moreover, the clinical facts also would seem to oppose the contention.

The infection seems to occur through the mouth, the general system being involved later and secondarily. The manner in which the primary infection occurs, and how it gives rise to the manifestations of the disease in the mouth, are points on which it is not easy to make any definite statement, and require further investigation.

In conclusion, gentlemen, I submit that the facts adduced seem to prove that scurvy is not due to either the presence or absence of any particular kind of food, but rather to an infection for which food may act as a vehicle under conditions of dirty storage or dirty preparation; and, considering that the disease prevailed in inverse proportion to the standard of personal hygiene of the individuals affected, its infectivity would seem to depend on the insanitary habits and perhaps the unwholesome occupation of those who were its victims.

WEEKLY DIETARY SCALES AND INCIDENCE OF SCURVY.

A.—*In use at all Burgher Camps till December 31st*, 1901.

Adults.—Flour, 7 lb.; sugar, 12 oz.; ground coffee, 6 oz.; salt, 4 oz.; tinned meat, 2 lb.

Children (6-12).—Flour, 7 lb.; sugar, 12 oz.; ground coffee, 3 oz.; salt, 2 oz.; tinned meat, 1 lb.

Children (1-6).—Flour, $3\frac{1}{2}$ lb. Remainder, as children (6-12).

Note.—When fresh meat served out.- Adults, 3 lbs.; children, 2 lbs. Tinned milk issued, "made up" by dispensers with

water, ready for drinking, for children only, and issued daily, but for adults only on Medical Officer's order. Wood and coal issued when required.

B.—*Introduced to all Burgher Camps, January 1st*, 1902.

Age	Vegetables	Flour	Syrup or Sugar	Coffee	Fresh Meat	Salt	Milk	Rice	Soap	Butter
	lb.	lb.	oz.	oz.	lb.	oz.		lb.	lb.	oz.
Adults	$1\frac{1}{2}$	7	12	7	4	4	1 tin	1	$\frac{1}{2}$	4
Children, 6-12 ..	$1\frac{1}{2}$	5	12	4	3	4	7 qts.*	$\frac{1}{2}$	$\frac{1}{2}$	4
Children, 2-5	As supplied by Camp Matron	$3\frac{1}{2}$	12	—	2	2	14 qts.*	$\frac{1}{2}$	$\frac{1}{2}$	4
Children under 2 years		$2\frac{1}{2}$	12	—	—	2	14 qts.*	—	$\frac{1}{2}$	4

* Tinned milk, made up by dispensers with water, daily ready for consumption.

A + B.—*Incidence of Scurvy.*

Camp populations—Children, 48 per cent.; adults—male, 12 per cent.; female, 40 per cent.

Burgher Camp, Volkrust. Population, 5,000. *Nil.*
,, ,, Standerton. ,, 5,000. ,,
,, ,, Middelberg. ,, 6,000. Europeans, 100 cases. Outbreak in December, 1901, and January, 1902.

C.—*European Soldiers—at various times.*

Bacon or cheese, jam, frozen meat, fresh meat, tinned vegetables and meat, coffee, sugar, salt, rum, soap and fuel, tea, lime-juice (not usually taken).

Admissions to No. 17, General Hospital, Standerton, 22,000. *Scurvy, nil.*
Examined on duty, 3,000. *Scurvy, one.**

* This man was in charge of transport section of Native Sanitary Corps, F.I. 2.

D.—*For Natives employed in Burgher Camps: Standerton, Middelberg, and Volkrust.*

Flour, 7 lb.; sugar, 8 oz.; coffee, 4 oz.; salt, 4 oz.; meat, 1 lb.

Total employed at each camp, 150.
Scurvy at Middelberg, *one case.*
,, Standerton and Volkrust, *nil.*

E.—*For Natives employed by Military as Muleteers.*

Lime-juice issued in December, 1902, but not taken.

Bread, flour, or biscuits, 7 lb.; sugar, 14 oz.; coffee, 3 oz.; meat, 7 lb.; salt, 2 oz.; tinned vegetables bi-weekly, as for European troops.

Attached—1st Essex, Rifle Brigade, Leicesters. 60 examined (July, 1902) outside Standerton. *Scurvy, nil.*
Attached—Army Service Corps Transport *at Standerton*, 1903.
Officers' Cape Cart line, 9 men. *Scurvy, nil.*
Police .. .. 8 men. *Scurvy*, 4.
Muleteers, 400 examined. *Scurvy*, 32 per cent.
Attached—Pom-pom Section, 9 men. *Scurvy, nil.*
Attached—19th Hussars and 83rd Field Battery R.A., 63 men. *Scurvy*, 22 per cent., *at Standerton*, 1903.

F.—*For Labourers employed by Military as Porters and Scavengers.*

Mealy meal, 16 lb.; meat, fresh, 1 lb.; lime-juice, 1 oz. weekly in December, 1902, but not taken.

Excess* mealy meal, fermented = a drink called "Mahow" (intoxicating).

* Can be burnt and drunk as a black liquor = native coffee.

I.—*Native Sanitary Corps = Scavengers.*

February, 1903, at Standerton.

(1) Examined, 34. *Scurvy*, 76 per cent.
(2) Transport,* 7. *Scurvy*, 100 per cent.
(3) Later examined, 20. *Scurvy*, 100 per cent.
(4) Head native with family of six, living separate. *Scurvy, nil.*

* To the Transport section is attached European under Dietary C, who was affected with scurvy.

II.—*Native Labour Corps = Porters.*

Employed, 120. *Scurvy*, 17 per cent. Examined February, 1903, at Standerton.

G.—*Natives employed by Repatriation Department, Standerton, as Muleteers.*

Biscuits, flour, or meal, 7 lb.; meat, chiefly fresh, 7 lb.; coffee, 7 oz.; salt, $3\frac{1}{2}$ oz.; lime-juice, 1 oz.; sugar, 21 oz.; wood, 14 lb.

Employed, 900; examined, 500. *Scurvy*, 50 per cent.
In hospital, 14; *scurvy*, $\frac{12}{14}$ = 86 per cent.
In detention tents, 14; *scurvy*, $\frac{12}{14}$ = 86 per cent.

COLD WEATHER MOSQUITO NOTES FROM INDIA—MALARIA IN UMRITZAR AND ITS CAUSES.

By Lieut.-Col. G. M. Giles, M.B., F.R.C.S., I.M.S. (Retired).

(*Continued from p.* 86.)

As your readers are perhaps aware, the Indian military authorities have recently made some attempts to introduce anti-malarial sanitation into some of our large stations.

The cantonment of Mian Mir, which has been one of the places selected for experiment, has long borne an unenviable reputation for the prevalence of malaria. It is situated about four miles from the great native city of Lahore, the capital of the Punjab.

Many years ago, when young and green in the service, I was directed to take over charge of the 9th Bengal Infantry, which had for many years been under the charge of an officer of considerable seniority. In "taking over" one is, of course, supposed to satisfy oneself that all records have been filled in up to date, but when a youngster takes over from an officer who in a few years may become his administrative chief, it is hardly wise for the former to be too exacting in such matters.

To my intense disgust, I found that the "Medical History Sheets" of the entire battalion had never been filled in for some nine or ten years, except in the case of men recommended for sick leave, in which case the Hospital Assistant had hastily compiled the one required, by the aid of the patient's memory, and had so kept matters from the notice of his superior.

It took me some three months of most tedious labour to bring up the sheets to date from the "Admission and Discharge" books; but during the process I acquired an exceptional knowledge of the past medical history of the corps, and the point that most struck me was the appalling effect on the health of the men caused by a two years' residence in Mian Mir. I doubt if a single man escaped without several attacks of fever, necessitating admission to hospital, and it is no exaggeration to state that by the time it got the route to another station the regiment was, for all practical purposes of active service, reduced to a mere name on the Army list, and it was years before the men had sufficiently recovered from the insidious effects of chronic malarial poisoning for the corps to be again considered "fit to go anywhere and do anything." What Mian Mir was then it has been pretty well ever since, and is now.

Last year, indeed, so virulent and long continued was the disease that it became necessary to continue drafting off convalescents from the British regiments to the hills far into November—a measure which has never been adopted before. So that whatever steps have been taken it is sufficiently apparent that they have as yet had no appreciable effect in staying the spread of the disorder.

It is most undesirable that the word "failure" should be allowed to associate itself with anti-malarial sanitation, and being anxious to see for myself the causes of this unsatisfactory state of affairs, I have recently made a short stay in the place which up to now I had never visited.

To commence with, it may be well to point out that on account of its huge area Mian Mir is about the last place that should have been selected for experimental purposes. We may take it for granted that the measures most suitable for adoption in India will not be hit upon at the first attempt, and that much money will be wasted unless the subject be first worked at in places of more manageable dimensions. After inspecting the place, I do not entertain the least doubt that the anti-malarial sanitation of the troops in Mian Mir is perfectly practicable; but it will take some time before any appreciable good can be effected in an area of some 12 square miles, and meanwhile careful experiments, *without stint as to expense*, should be instituted in some compact "half battalion station," such as, *e.g.*, the cantonment of Sitapur, in Oudh.

The Mian Mir cantonment may be said to be in the form of a square, with rather irregularly clipped corners, its greatest length and breadth being each about 4¼ miles. A large proportion, however, of its area is open country, retained probably with a view to the necessity of future extensions; and what may be called the settled area is an oblong block of land, lying near the western boundary of cantonment limits, about 4 miles long, from north to south, and about a mile from east to west.

With the exception, however, of three small bazaars, the population is extremely scattered, consisting of widely-separated barracks and the villas of the various officials and a few private residents, with large open spaces in the form of parade grounds, public gardens, cricket fields, &c., so that there is nothing at all corresponding to the European idea of a town. From the point of view, indeed, of tropical sanitation the habitations are far too scattered, as the numerous unused spaces are unmanageably large, and it would be a task of the greatest difficulty to keep them free from puddles during the rainy season. The climate is of the Continental type—intensely hot in summer, and distinctly cold during the winter months.

The total rainfall, as will be seen from the following table, is moderate, and almost confined to the months from June to September, inclusive, more than half the annual total falling in the two months of July and August. During the four months in question it will be noticed that the number of rainy days and of inches rainfall in a month usually roughly coincides, or, in other words, about an inch of rain falls on each rainy day—an amount amply sufficient, even in this climate, to provide plenty of puddles permanent enough for the rearing of a generation of mosquitos.

The marked difference between the rainfall of two places so close to each other and so similarly situated as Mian Mir and Lahore can hardly be explained, except by some difference of local conditions, the determining factor being probably the larger amount of canal irrigation in Mian Mir, a large portion of the Lahore area being occupied by the closely-packed houses of the great native city.

Judged by the eye alone, the ground is everywhere almost a dead level, there being only 9 feet difference between the highest and lowest points of the surface in their cantonment limits, the highest point being a stretch of open, irrigated land in the north-east corner, 710 feet above the sea-level, while the extreme south-east corner is but 701 feet. The general slope of the land within the settled area is from north to south; the Saddr Bazaar, to the north, being 707 feet, and the Artillery Bazaar, to the south, 704 feet, so that in a distance of nearly 4 miles there is only a fall of 3 feet, and the lateral gradients are but little better.

Under these circumstances it can easily be imagined that efficient surface drainage is a matter of the greatest difficulty, the only possible outfall being into the River Ravi district, some 5 or 6 miles to the north. The bed of this river is 676 feet above the sea at this point, but when in flood its surface may reach 692 feet; so that at the time when surface drainage is most urgently needed, the available fall may be but 15 feet in a distance of 9 or 10 miles. Under these circumstances it is obvious that any water wasted, or otherwise carelessly applied in the course of irrigated cultivation, must necessarily lie for a long period, and cannot fail to furnish breeding places for mosquitoes to an

TABLE SHOWING THE AVERAGE MONTHLY AND ANNUAL RAINFALL, AND NUMBER OF RAINY DAYS FOR THE STATIONS OF MIAN MIR AND LAHORE.

	Jan.		Feb.		Mar.		April		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Total of Annual	
	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall	No. rainy days	Rainfall
Mian Mir	1·8	1·24	2·4	1·25	1·2	0·66	1·5	0·68	1·8	1·37	2·7	2·14	5·4	6·10	5·2	5·10	2·0	2·80	0·6	0·57	0·4	0·31	0·5	0·33	25·5	22·55
Lahore	1·5	0·66	2·0	0·88	1·6	0·65	0·9	0·37	2·0	0·67	1·8	1·35	6·5	5·08	5·1	4·63	3·7	2·44	0·6	0·43	0·1	0·08	0·6	0·37	26·4	17·31

extent which must reduce all other sources to comparative insignificance.

The system of surface drainage may be said to be well meant, as I did not notice any instance of drains designed to flow uphill, such as are not uncommon in India, where it is difficult to judge the lie of the land without delicate levelling instruments, and where such matters are too often entrusted to the cantonment magistrate, or some other such official equally innocent of the rudiments of either sanitation or engineering. One large cutting is carried from near the southern end of the occupied area right into the River Ravi. But the other, from the north, apparently runs nowhere in particular and simply ends in the open.

The multiplication of surface drains is, however, by no means an unmixed blessing *qua* the prophylaxis of malaria; as, unless very carefully designed and attended to, they generally do more harm than good. The real weak point in the surface drainage of Mian Mir lies in the want of intelligent attention to detail. It is quite commonly the case that the earth, dug out to form a gutter round some large open space, such as a parade ground, has been simply thrown inwards on to it, so as to form a low enclosing embankment some inches high, with the result that each heavy shower turns the ground into a shallow lake, the water of which can only escape by evaporation and absorption, while hedges and walls round compounds often cause even more serious obstruction to the escape of rain water.

The soil consists of a thin layer of cultivable loam, beneath which lie several feet of a nodular limestone, known as *kunkur*, and below this sand. Surface water lies about for a considerable period, though Mian Mir is better in this respect than much of the surrounding country, except where the soil is clogged with silt, as in the irrigated parts of the cantonment; and in these situations the ground is perceptibly and unwholesomely damp at all periods of the year.

Great efforts have, however, been made to secure the surface drainage of the European Infantry and Artillery lines; the ground between the barracks is drained by shallow gutters of cemented bricks, which when first laid down were, no doubt, carefully and evenly graded. Even with the best of work, however, a certain amount of irregular settlement is inevitable, and seven days after a heavy fall of rain all these drains, with the exception of one, evidently recently laid, were neither more nor less than almost continuous strings of puddles, and compared unfavourably with certain unrivetted surface drains, by which they were supplemented. Most of these surface drains were of the old faulty semi-circular section, only one or two being properly cunetted. When it is remembered that *Anopheles* larvæ will flourish in such apparently unlikely places as a puddle, fed by a stand-pipe, scarcely half an inch deep in the middle of the cemented surface of the platform of a busy railway junction, there can be little doubt that during the rains these drains must occasionally be efficient sources of supply to the barracks they surround, and that until they are relaid and properly cunetted Mian Mir would be better without them; though, of course, the amount of labour required to brush the water out of them once a week would not be serious.

The water supply is drawn from the canal, and although the source is a good deal liable to pollution, is filtered through sand bells, and is, I believe, but rarely open to suspicion, nor is it distributed in a manner likely to in any way appreciably increase the possibilities of the breeding of mosquitoes.

There are comparatively few wells, and though no doubt each of these produces its quotum of neighbouring puddles, there would be no difficulty in keeping these harmless with a very moderate amount of supervision.

The natural features, then, of the Mian Mir cantonment are very much those of the majority of military stations in Northern India, for the difficulty of obtaining a sufficient outfall for surface drainage is a common characteristic of nearly all of them, and the area as it was when originally selected, had many favourable features of soil and exposure, being a barren, almost treeless, waste, with but little cultivation of any kind in its immediate neighbourhood. The medical authorities of the time held the opinion that trees, moisture, and cultivation were unfavourable to health in tropical climates, and there can be no doubt that they were right. But that in its early days the slowly rising cantonment, with its extensive building operations, should prove unhealthy is only what might be expected, for building work and puddles are inseparable. Moreover, with the imperfect knowledge as to the way in which moisture was responsible for malaria then available, the majority of the excavations would be regarded as harmless and left unremedied.

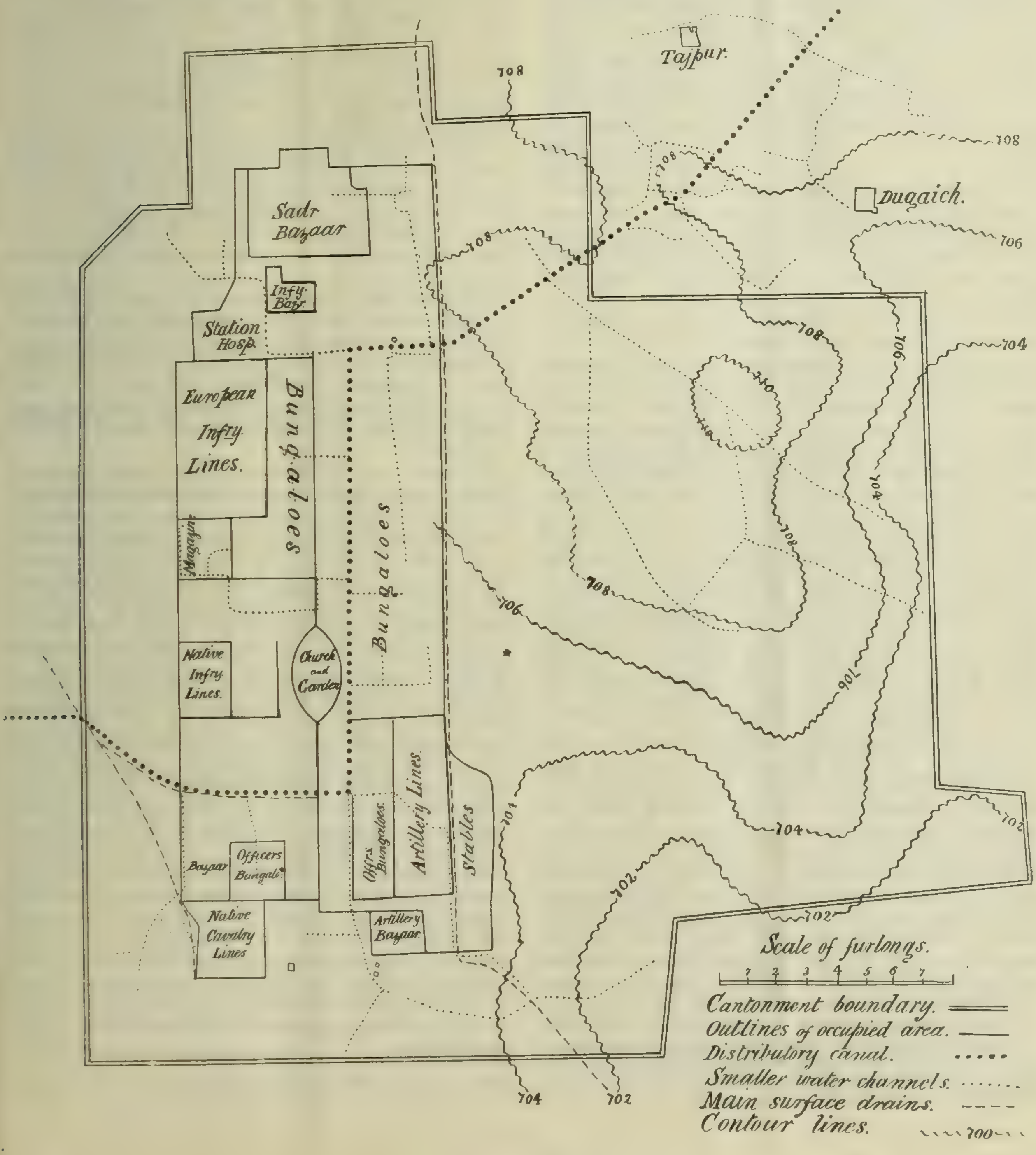
So pronounced, however, were the views of the then military authorities as to the dangers of irrigation that when, in 1851, the civil authorities proposed to carry the main channel of the projected Ban Doat Canal through the cantonment, the military authorities protested; and although the engineers pointed out "that running water had no tendency to cause miasmata," the alignment of the canal was altered in deference to military opinion. The canal was not, however, opened until 1861, and it was not until 1866 that, owing to a change of military medical opinion, a branch was constructed to supply the cantonment, which was completed in 1868. At first the supply was but 10 to 12 cubic feet per second, but ever-increasing demands have brought the supply, at the present date, up to 40 cubic feet; or, in other words, the branch when running distributes over the cantonment area the enormous amount of twenty-one and a half million gallons in each day.

It must further be remembered that the canal does not run continuously, but only about seven days in each month, and that as the number of persons supplied is very large, each garden will be often left without water for from five to fifteen days, and that during the intervals each canal bed will necessarily become a chain of puddles.

A glance at the dotted lines in the accompanying sketch map will show how thoroughly the place is permeated by the system; but the lines shown are merely the main arteries, as it would be impossible

to show on the scale the minute network which is privately constructed within each garden in order to properly utilise the water. Were these filled in almost the whole area, with the exception of the various lines and parade grounds, would appear much like a diagram of the capillary circulation, saving only that none of the fluid ever reaches the draining veins, but is absorbed, with the inevitable effect of greatly raising the spring levels. When the water reaches the gardens it is some 3 or 4 feet below the ground level, and is received into a small pond, from which it is raised either by animal or manual power.

There must be hundreds of these pits scattered over the area, all of which are continuously full of water throughout the year, and quite apart from their potentialities in the production of malaria, these pits, full of decomposing vegetable matter, always within a few yards of the residences to which they belong, can hardly be favourable to health, as may be judged from the fact that the effluvia from one I searched for wintering larvæ were so overpowering that a few minutes' fishing sufficed to produce a severe headache lasting the rest of the day. Wherever a water channel is carried under a road there is a syphon with a full pit



at either end; and when to these are added the innumerable waste puddles, which can only be avoided by a most minute and continuous supervision, it will be, I think, admitted that any efforts at reducing the number of otherwise produced breeding places, while this practically uncontrollable source exists, are like Mrs. Partington's efforts to keep out the tidal wave with her mop; only the good lady should be represented as ignoring the inflow of the sea, and busy the while in sopping up the spilt contents of a tea-cup with her handkerchief.

Round each of the "lines" or groups of barracks are placed the bungalows of the officers and other residents. Each of these little villas is situated in a compound of about an acre or more in extent, the greater part of which is usually laid out as a garden; and these gardens, it must be remembered, are within easy flight for a mosquito of the barracks, occupied by the troops. Added to this, a large portion of the unoccupied area is rented to native cultivators; the fields in many cases coming close up to the barracks, there being, *e.g.*, a large stretch of such ground between the Saddr bazaar and the European Infantry lines; and as the rent of these lands forms a large item of the income of the Cantonment Fund, the system is hardly likely to be ended without a severe struggle with those responsible for the general management of the station, as all charges for the maintenance of roads, conservancy, &c., have to be met from this fund.

The effect of the introduction of canal irrigation on the health of the station was marked and immediate. By the courtesy of the Director-General's office, I have before me a statement of the admission rates per 1,000 for European troops in Mian Mir from 1859 to 1902, inclusive. Up to the year 1889 the figures refer to admissions from all forms of fever; those from malaria alone being not available; but for our purposes they are none the less valuable on this account, as any increase of malarial admissions must necessarily be included in the total fever rate, and errors due to faulty diagnosis and the fluctuations of medical opinion as to what should or should not be regarded as malarial fever are thereby excluded. In the eight years, from 1859 to 1866 inclusive, when the station was not irrigated, the average total febrile admission rate was 684·8; the healthiest year being 1860, with a rate of 305·0, and the most sickly, 1862, with 1,005·1 febrile admissions. In 1867, during which year the canal was under construction, as a natural result of the temporary increase in mosquito breeding places, inseparable from engineering construction works of all sorts, the admission rate went up to the thereto unprecedented figure of 1,288·3; while in the first eight years of canal irrigation, from 1868 to 1875 inclusive, the average rate was 1,388, or, roughly, just double what it was in pre-irrigation times; the heathiest year being 1871, with 438·8 admissions per 1,000, and the most sickly, 1869, with 2,383·0. Nor have matters improved with the lapse of time, for, as a matter of fact, the steady increase of irrigation has counterbalanced the great improvements in general sanitation and in detailed care of the soldiers' health that have been adopted during late years.

I have taken the eight years immediately following the introduction of irrigation separately, because the men compared are strictly comparable with the men of the eight years preceding it, both periods being well before the introduction of short service, so that the objection that one can hear rising to the lips of the military apologist that it is impossible to compare the seasoned men of the good old times with the weakly short service weeds of the present at once falls to the ground; but, as a matter of fact, the table shows that there is little to choose between the susceptibility of the "weeds" and the veterans. The average of the last ten years to 1902 inclusive is 1,012·5, an apparent improvement in the first eight years of irrigation it is true; but it must be remembered that of late the policy of sending European soldiers for change to the hills has greatly developed, so that it is now rare for any one man to be continuously exposed to the influences of an entire malarial season.

This last decennium includes the exceptionally healthy year 1902, with its ratio of but 331; but even this it will be noticed is not as satisfactory as that of the 305·0 of the year 1860, and though the figures for the year 1903 are not yet published, it is, I believe, a fact that it has proved to be a rather exceptionally malarious year.

For the entire period of thirty-five years, from 1868 to 1902 inclusive, that have elapsed since the introduction of irrigation into Mian Mir, the total febrile average admission rate per 1,000 has been 1,386·2 per *mille*, the two healthiest years being 1871 and 1902, with rates of 438·8 and 331·0 respectively, and the most sickly the years 1878 and 1879, with rates of 2,672·0 and 3,427·1.

Without wearying the reader with further statistical details, I will further remark that it is perfectly easy for anyone to pick out the irrigated from the unirrigated cantonments of Northern India by merely referring to the sickness returns of the different stations for any one year, and in the face of such facts I maintain that the retention of canal irrigation within the limits of any military cantonment a day longer than can be avoided is little short of criminal. Nor will it suffice to merely cease irrigation by cutting off the water, as this alone will merely secure a diminution of the annual duration of malaria. It will also be necessary to fill in the canals, and carefully level their alignment, as well as the water-lift pits, syphons, and other accessories of the system. If this be not done each empty watercourse will be turned, during the rains, into long chains of puddles, far more pernicious than the flowing water.

Owing to the amount of silt brought down with the canal water, there is accumulated on the sides of each channel an amount of material much more than sufficient to fill in the channels themselves, and the surplus soil should be utilised for filling in the lift pits and any other depressions of the surface that can be found, whether ascribable to irrigation or otherwise. If this be not done, elevated banks will be left along the line of each channel, to the inevitable obstruction of surface drainage.

(To be continued.)

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THE

Journal of Tropical Medicine

April 1, 1904.

PLAGUE IN JOHANNESBURG.

The appearance of plague in Johannesburg was not unexpected by those who have had experience of plague and who have watched the course of the disease in South Africa. Plague was first heard of in South Africa at Cape Town, and since the original outbreak the disease has continued with persistency, although it never has prevailed with any marked severity. The towns officially notified as afflicted by plague in Cape Colony have been—Cape Town, Port Elizabeth, Queenstown, East London, Knysna, and King Williamstown. Of these Port Elizabeth has suffered most severely. In Durban, Natal, plague prevailed for a time—September, 1902, to March, 1903.

Since the commencement of the outbreak in Cape Town, to February, 27th, 1904, the number of cases of plague recorded in South Africa amounted to 1,290, and the deaths from the disease to 600. At no time and at no place, however, has plague prevailed with any degree of severity, the chief feature of the characteristics of plague in South Africa being its persistency.

In January, 1903, Cape Colony was entirely free from plague in human beings up to the 24th of the month, but the freedom from the disease was a mere remission, as there followed an intermittently increasing mortality from plague up to the second and third weeks of April, 1903, when the death-rates from plague in Cape Colony amounted to sixteen and seventeen respectively.

Plague in Johannesburg is announced to have occurred quite suddenly; but all observers of the epidemiology of plague agree that a severe outbreak of bubonic plague never occurs suddenly; therefore the large number of cases reported from Johannesburg on March 23rd would seem to require explanation. A telegram dated March 20th announced eight deaths from plague having occurred in Johannesburg; and a second telegram, dated March 23rd, gave the number of cases in the city as seventy, and the deaths from the disease no less than fifty. Bubonic plague does not advance with this rapidity; and that forty-two persons presumably attacked between the initial announcement on the 20th, and the third day of the outbreak—the 23rd—should have succumbed to the disease, is not in accordance with previous records.

The explanation must be sought for in the statement, also telegraphed from Johannesburg, but upon what authority is not known, that the variety of plague present in Johannesburg was the pneumonic and not the bubonic. Pneumonic plague would serve to explain to some extent the rapidity of the onset and the speedy deaths of those attacked. We are in hopes that the disease may prove to be the pneumonic variety; for were it the bubonic form of plague that is reported from Johannesburg, we have no hesitation in saying that it has existed there for some

time before March 20th; and that the disease must have either been unrecognised or that the authorities chose to keep the outbreak quiet.

That the cities of the Transvaal would escape plague, whilst many foci of the disease existed in Cape Colony, was most improbable, and we know that the Johannesburg municipal authorities, through their medical officers of health, were on the watch, and had all the machinery for an outbreak of plague ready. The insidious introduction of pneumonic plague, however, defies the best appointed system of quarantine or medical inspection. Cases of ordinary pneumonia constantly occur in any locality, and it is only when the extent or extremely fatal nature of the outbreak is observed that attention is arrested, and the suspicion of the plague bacillus being the cause aroused. In this way is no doubt to be explained the rapid hold plague seems to have obtained upon a section of the population of Johannesburg.

The seriousness of the outbreak has evidently not yet dawned upon the authorities. They have got over the initial scare, unfortunately for the community, and are accepting the inevitable. Not that they are relaxing their efforts to limit the disease; but it is evident that the sanitary authorities are lulling Lord Milner's fears and have persuaded him that they are quite fit to cope with the disease, and that all that can officially be done has been done. It was the reply from India, Mauritius and other parts of the Empire several years ago, and we are sorry to see it repeated after all the bitter experiences in these countries. The suggestion to send help from this country was refused by Lord Milner; it is a responsibility which few men would care to take, and up to the present there is no man who has refused help so proffered but has lived to repent it.

The sanitary service of the Transvaal is under capable management, the medical officers are well trained and quite efficient; but a plague outbreak demands special workers, and an increased staff; the sanitary service officers cannot do both, they can attend to plague and neglect other work, or *vice versa*—there can be no compromise. The consequence of the medical and sanitary staff being called upon to treat plague patients and to administer the plague hospitals, is to deprive the other parts of the country of that supervision which is absolutely necessary if plague is to be prevented spreading to other parts of the country; for it is not sufficient to keep human beings only under observation. Plague spreads by animals, and by animals not rats only are meant. It has been and unfortunately is still the custom, to merely examine rats and to rest content if they are free of the disease. Almost all, if not all, domestic animals contract plague and by them plague is spread more insidiously than by rats, for the rat early gives signs of illness, but the pig, the fowl, &c., may have plague with high fever for several weeks and give no sign of ill-health. Professor W. R. Simpson proved this fact in Hong Kong some two years ago, but so far as we can ascertain little attention has been paid to it in Cape Colony.

What is wanted at the present moment is an expert staff of medical officers, independent of the present Health Department in the Transvaal, to attend to plague alone; the present staff of officers to go on with their usual duties. At least twenty medical men who have knowledge of the treatment and the management of plague should be sent out under a medical man experienced in sanitation and accustomed to deal with epidemics.

If the present staff of the Sanitary Department of the Transvaal is of sufficient number to attend to the general sanitation of the country, and also to undertake plague work as well, it is plain that in the absence of an epidemic they are too numerous for the wants of the colony. If they are barely sufficient for the general wants of the colony then they are too few to deal with a serious outbreak of plague in addition. We hope for the sake of the sufferers from plague, for the welfare of the Transvaal, and for the

public reputation of those responsible for refusing help offered them by the home authorities, that the decision may be reconsidered; and that the recrimination certain to follow—the refusal of the proffered assistance of experts may be thereby avoided. J. C.

Review.

La Fievre Jaune. Par le Dr. J. Th. Dupuy. La Peste. Par le Même Autour. Paris: F. R. de Rudeval, 4, Rue Antoins Dubois.

Dr. Dupuy, in the two books before us, tells of his experience of the above diseases. In his work on Yellow Fever, the author urges the advantage of having laboratories on board passenger boats, thus realising a rapid and true diagnosis, and also ensuring a rational treatment by serum, of the affections. He gives us the results of his studies on the epidemiology of the disease, and indicates the special circumstances attending the outbreak. He strongly recommends treatment by serum therapeusis. These researches were written in 1899, when the theory of Sanarelli held the day. Since this date, however, the views of this *savant* no longer hold the same value; although the newer researches have not yet discovered the organism causing yellow fever. He holds that the facts concerning the epidemic at Santiago last summer determine a certain amount of hesitation as regards the efficacy of the prophylaxis recommended by the American Commission. Dr. Dupuy, whilst believing that the *Stegomyia* certainly plays a part in propagating the disease, does not consider it is the only means of spreading the disease.

In his work on Plague, the author critically reviews the methods of precaution that must be taken both in harbour and in the interior of the country. He details the minutiæ of disinfecting a ship very thoroughly. The latter part of the work contains observations on forty-four individuals who were treated with Yersin's serum used prophylactically; their medical histories were followed for six months, and no untoward results were seen to occur. Dr. Dupuy concludes that the contagion of plague is generally feeble, and that we are better prepared to act against it than against the other endemic diseases, and he finally expresses his opinion that a definite and precise series of regulations concerning the means of prophylaxis cannot be laid down so as to embrace every outbreak.

Washing Fæces.—Cross, C. V., in the *Medical Record*, February 20th, 1904, recommends a simple expedient whereby search for gall-stones, &c., may be made in the fæces. Place an ordinary flour sifter in a commode or water closet basin. The stool is received in the sifter, and may be freely washed by a stream of water.

Notes and News.

Sleeping Sickness.—The transmission of sleeping sickness by flies of the genus *Glossina* is the subject of an interesting letter in the *British Medical Journal* of March, 19th, 1904, p. 696, by Dr. Louis Sambon. He states "that there can be no further doubt as to the presence of sexual forms" of trypanosomes.

Liverpool School of Tropical Medicine.—Since the foundation of the School twelve expeditions have been dispatched to different parts of the Tropics to prosecute the study of malaria, yellow fever, trypanosomiasis and general tropical sanitation.

Panama.—It is satisfactory to note that President Roosevelt has been approached upon the necessity of taking vigorous hygienic measures anent possible outbreaks of disease amongst labourers engaged in the construction of the Panama Canal.

Ankylostomiasis in Porto Rico.—The Government of Porto Rico has instituted an investigation into the prevalence of anæmia in the island.

Leprosy Investigation.—A scheme is a-foot to institute a bacteriological laboratory at the leper settlement of Molokai, Hawaii. It is further contemplated to invite investigators from all parts of the world to take part in the work.

The Anti-malaria Campaign in Ismailia, so successfully carried on by Major Ronald Ross, does not seem to have met with the recognition it deserves in France. The Chairman of the Suez Canal Company, Prince d'Arenberg, when reporting the fact that Ismailia was now free of malaria, to the Paris Académie des Sciences, "forgot" to mention that it was directly due to Major Ross's efforts that this satisfactory result had been obtained. To M. Laveran the successful issue was ascribed, and Major Ross's name, so far as we know, was not mentioned. This is so foreign to the chivalrous characteristics of the French nature that we are of the belief that the Prince has been wrongly reported; if, on the other hand, the omission did occur, we are convinced it was wholly inadvertent.

Anti-Malarial Teaching in Schools.—Sir William MacGregor, K.C.M.G., M.D., whilst Governor of Lagos, set the example of providing instruction in practical sanitation in schools in the colony of Lagos. The initial difficulty was to persuade the School Boards and teachers of the colony that the modern ideas of malaria infection were facts. The old tropical hand in many instances still scouts the idea that mosquitoes have anything to do with malaria, and is fully persuaded that whisky is the one prophylactic to be relied upon. Dr. Strachan, C.M.G., and Dr. Best, gave the initial courses of instruction, and, after an examination for teachers, certificates were issued entitling them to

teach sanitation in the schools. Some 300 scholars in the school entered for the examinations during 1903. As a model of practical teaching may be mentioned the circumstance that the scholars were made to watch the development of mosquitoes from the larvæ in stagnant water. Simple as this procedure seems it is absolutely necessary, as many people—not only African natives, but Europeans in Europe—cannot bring themselves to believe that the worm-like larvæ inhabiting water can ever become the winged and active mosquito. We congratulate Sir Wm. MacGregor upon taking the initiative in this matter, and hope to find all school authorities not only in the Tropics, but throughout the Empire, following his excellent example.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Durham, H. E. Notes on Beri-Beri in the Malay Peninsula and in Christmas Island (Indian Ocean). *Journal of Hygiene*, 1904, vol. iv., No. 1.—Whilst engaged upon the Béri-Beri Commission of the London School of Tropical Medicine, Dr. Durham had the opportunity of studying beri-beri, as it is affected by the diet, by race, by habitation, and by seasonal variation. His report is of considerable value, and well worthy of close perusal.

(1) As regards *diet*, the substance of Durham's observations amounts to this, that the well-to-do escape the disease, while those that were poorly-nourished are liable to be attacked by beri-beri. In the Pudu Gaol, Selangor, the addition of 6 ozs. of meat to the diet lessened the number of cases of, and the mortality from, beri-beri. Return to the usual meagre diet of the prison was attended by a marked increase of the disease within three weeks of its commencement. Dried fish had nothing to do with the increase, as those who did not partake of it suffered from beri-beri as well as those who did.

(2) *Race.*—Of the several races under Dr. Durham's observation, the Chinese suffered severely from beri-beri; the Tamils also suffered from an epidemic of the disease; Malays to a slight extent; Europeans, Eurasians and Sikhs escaped the disease.

(3) *Locality.*—Persons living in towns suffered from beri-beri to a less extent than those coming from mining camps. Instances of beri-beri disappearing with the departure of infected persons are many. When the Japanese left Fiji, beri-beri disappeared at once. The belief held by many that particular ships or houses are infective does not hold good. The benefit of removal of the patient from the locality where the disease prevails, although insisted upon by many observers, is not, according to Dr. Durham, a specific necessity, but merely a general aid to recovery.

(4) *Analysis of Food* does not help much in elucidating the cause of beri-beri. Nitrogen starvation at one time put forward as a cause is untenable; but Dr. Durham claims a relationship between phosphorus in the foods and immunity from beri-beri. In this way wheat-eaters benefit more than rice-eaters.

(5) Experiments on animals were negative, whether they consisted of feeding on dried fish and rice, of injection of serum of beri-beri patients, of exhibition of dust from infected localities, or of administering the gastro-intestinal contents obtained at fresh *post-mortem* examinations of beri-beri cases.

(6) Of clinical observations, a marked faucial redness at the initial stage of the disease is recorded by Durham, and from the throat a number of cultures were made, showing "small-looped" colonies, to almost the complete exclusion of other kinds of colonies; an exaggeration of knee-jerks is remarked upon as invariably preceding loss of the same. Hoarseness and swollen tender gums were noted by Durham.

(7) Many facts appear to confirm the possibility of contact as a means of spreading beri-beri. Statistics show that the greatest beri-beri mortality occurs during the first six months of residence. One case quoted by Durham shows that after reaching an infected locality a healthy man showed well-marked signs of the disease on the sixteenth day, and died on the thirty-eighth day after arrival.

(8) Seasonal prevalence does not seem to be a marked factor in beri-beri outbreaks.

(9) The dietetic or physiological, the unsound food, the arsenical, and the emanation theories all appear to be insufficiently in accordance with the attendant circumstances, to have accounted for the spread of the disease.

Dysentery.

Jürgens. The Etiology of Dysentery. *Deut. Med. Wochenschrift*, November 12th, 1903.

Todd, C. On a Dysentery Antitoxin. *Brit. Med. Journ.*, December 5th, 1903.

Dysentery, or Typhoid.

Warfield, L. M. *Bulletin Ayer Clinical Laboratory*, Pennsylvania, U.S.A., October, 1903.—In a patient suffering from fever, with copious stools consisting wholly of blood and mucus, in which no amœba were present, but rod-shaped bacilli in fair numbers, Warfield found the blood gave Widal's test. The rod-shaped bacillus was isolated, and when submitted to various tests was shown to be the dysenteric bacillus of the acid-producing type. The patient's blood agglutinated with the dysenteric and the typhoid bacillus. This would appear to have been a case of mixed infection, and the importance of recognising cases of the kind, from a public health point of view, is evident. The case loses some of its scientific importance from the fact that the typhoid bacillus was not sought for in the fæces.

The study of cases of this nature lead one to enquire: (1) Is the Widal test an absolutely reliable sign of typhoid? (2) Do typhoid and dysentery actually co-exist more frequently than is generally allowed?

The necessity of destroying all fæcal evacuations in dysentery would appear to be imperative if it is actually proved that typhoid may co-exist with dysentery.

Liver.

FISCHER, B. Ueber Gullen Gangkarzinome, sowie über adenome und primäre Krebse der Leberzelle. *Virchow's Archives*, Berlin, vol. clxxiv., No. 3.—According to Fischer, the supposed primary cancers of the liver all originate in the bile passages. Several pathological conditions support this belief; amongst others being the fact that in 85 per cent. of cases of adenocarcinoma of the biliary system cirrhosis of the liver is present.

Malaria—Stamping out Malaria.

LENZ, O. Die Malaria Assamerung der Aussenwerke der Seefestung Pola. *Wiener Klinische Wochenschrift*, Vienna, vol. xvi., No. 49.—During the past three years a persistent attempt has been made to stamp out malaria from the Brioni Islands and the town of Barbariga, on the Austrian shores of the Adriatic. It is satisfactory to note the experiment has been succesful. The following experiences gathered during the process of extermination are reported by Lenz: (1) The tertian is the prevailing parasite in this (Istrian) district. (2) Koch's method of giving quinine as a prophylactic was not so successful in Istria as it has proved to be in tropical countries. Lenz considers that, as the parasites in the tertian form of malaria are ensconced in the spleen and bone marrow during latency, and are not present during the intervals of the attacks as in tropical malaria, they are not less accessible to quinine. (3) Persons suspected of chronic malaria were given 15 grains of quinine every day for fifteen days, and subsequently, during the malaria season 6 grains daily. (4) The whole of the people in the district were also given 6 grains daily. (5) The quinine was given in the evening. (6) Kerosene was poured on all exposed collections of water in the neighbourhood. (7) The finer the kerosene the better it spread on the water, and the less was required. (8) The water tanks must be coated with kerosene every eighth day. (9) Kerosene did not flavour the water when the water was drawn by tap from the bottom of the receptacle.

Sleeping Sickness.

CASTELLANI, A. Aetiologie der Schlafkrankheit der Niger. *Centralblatt f. Bacteriologie*, Jena, vol. xxxv., No. 1.

Spleen—Splenectomy.

BAYER, F. Statistisches uber Splenektomie und Mittellung eines Falles von Milz-Extirpation wegen idiopathischer Hypertrophie. *Münchener Medicinische Wochenschrift*, Munich, vol. li., No. 3.—Since 1891, according to Bayer, the spleen has been removed 254 times with 54 deaths. The mortality table in connection with splenectomy is instructive.

Disease for which Splenectomy performed.	Mortality.
Amyloid spleen	100 per cent.
Enlarged spleen with cirrhotic liver	100 ,, ,,
Leucæmic hypertrophy (8 cases)	75 ,, ,,
Benign growths (2 cases)	50 ,, ,,
Torsion of pedicle of wandering spleen (15 cases)	33·3 ,, ,,
Malaria (80 cases)	20·2 per cent.
Sarcoma	20 ,, ,,
Banti's disease (17 cases)	17·6 ,, ,,
Idiopathic hypertrophy (21 cases)	9·5 ,, ,,
Hydatid cysts (13 cases)	7·7 ,, ,,
Hypertrophied wandering spleen (29 cases)	6·9 ,, ,,
Splenic pseudo-leucæmia (1 case)	0 ,, ,,
Abscess (4 cases)	0 ,, ,,
Tuberculosis (3 cases)	0 ,, ,,
Hematoma (4 cases)	0 ,, ,,

Bayer in his paper records a recent case of splenectomy in a boy, aged 12. He removed the organ for idiopathic hypertrophy, *i.e.*, simple splenomegaly, in which, although anæmia is progressive, there is no leucæmia nor enlargement of lymph-glands.

Yellow Fever.

HAVELBURY, W. Mosquitoes and Yellow Fever. *Berliner Klinische Wochenschrift*, August 3rd, 1903.

Literary References.

TROPICAL DISEASES.

LEPROSY.

Angier. La lèpre au Cambodge: croyances et traditions, *Ann. d'hyg. et de méd. colon.*, Paris, 1903, vol. vi., p. 176.

Ashmead, A. S. The Surinam Lepers, *St. Louis M. and S. J.*, 1903, vol. lxxxiv., p. 303.

The Contagious Character of Leprosy, *Med. Press and Circular*, London, 1903, 2 s., vol. lxxv., p. 72.

Asselbergs. Un cas de lèpre maculeuse anesthésique, *Presse méd. belge*, Brux., 1903, vol. lv., p. 329.

Barannikoff, J. A. Bacteriology of Leprosy, *Russk. j. kozhn. i. ven. boliezn.*, Kharkov, 1903, vol. v., p. 433.

Baudouin, M. De la lèpre en Vendée et de la possibilité de son origine phénicienne, *Gaz. méd. de Par.*, 1902, vol. lxxiii., p. 409.

La lèpre et l'ergotisme en Bretagne, *Gaz. Med. de Paris*, 1903, 12 s., vol. iii., p. 264.

Bayet. Un cas de lèpre mutilante., *J. méd. de Brux.*, 1903, vol. viii., p. 731.

Belt, A. L. The Need of National Leprosaria, *Med. Herald*, St. Joseph, 1903, n. s., vol. xxii., p. 216.

Bernard, R., and **Bonnet, L.** Lèpre systematisée nerveuse à manifestations tardives, *Bull. et mém. Soc. méd. d. hop. de Paris*, 1903, 3 s., vol. xx., p. 4.

Beyer. Notes anatomo-pathologiques au sujet d'un cas de lèpre exogène observé à Anvers, *Ann. Soc. méd.-chir. d'Anvers*, 1903, vol. viii., p. 43.

Bjarnhjedinsson, S. Antallet af de spedalske i Island ved Udgangen of Aaret 1901 (the number of Lepers in Iceland at the close of 1901), *Ugeskr. f. Læger*, Kobenh., 1903, 5 R., vol. x., p. 649.

Black, R. S. Leprosy and its Treatment by Chaulmoogra Oil, *South African Med. Rec.*, Cape Town, 1903, vol. i., 53.

Boston, L. N. The Lepra Bacillus in the Circulating Blood, *Proc. Phila. Co. M. Soc.*, 1903, vol. xxiv., p. 6; also *Med. Bull.*, Phila., 1903, vol. xxv., p. 46.

Bracken, H. M. Report of the Committee on National Leper Homes, American Public Health Association Report, 1902, Columbus, 1903, vol. xxviii., p. 123; also *Lepra*, Leipzig, 1903, vol. iii., p. 211.

Brunon. Sainte Elisabeth de Hongrie et le lépreux, *Normandie méd.*, Rouen, 1903, vol. xviii., p. 37, 1 pl.

Charmeil. Un cas de lèpre. *Nord méd.*, Lille, 1903, vol. ix., p. 189.

Chlenoff, M. A. Is Leprosy Contagious? *Russk. Vrach*, St. Petersburg, 1903, vol. ii., pp. 441, 484.

Crane, A. A. Some Features of Leprosy in the Hawaiian Islands, *Yale Med. Journ.*, New Haven, 1903-4, vol. x., p. 130.

Daland, J. Leprosy in the Hawaiian Islands, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xli., p. 1125.
Observations upon Leprosy occurring in Japan, Iceland and Norway, *Proc. Phila. Co. M. Soc.*, Phila., 1903, vol. xxiv., p. 7; also *Med. Bull.*, Phila., 1903, vol. xxv., p. 49.
Danlos. Lèpre anesthésique, relief considérable des taches; dyspepsie, traitement par l'huile chaulmoogra en lavements, *Bull. Soc. franç. de dermat. et syph.*, Paris, 1903, vol. xiv., 212.
Deane, F. Increase of Leprosy in Barbados, West Indies, and two of the so-called Cured Cases, *Lancet*, London, 1903, vol. ii., p. 266.
Dehio, K. Neue Gesetzes-bestimmungen über die Behandlung und eventuelle Isolirung der Leprakranken in Russland, *St. Petersburg med. Wchnschr.*, 1903, n. F., vol. xx., p. 157.
New Laws on the Treatment and Ultimate Segregation of Lepers in Russia, *Lepra*, Leipzig, 1903, vol. iv., p. 1.
De Luca. Nuovi tentativi di cura della lebbra col mercurio, *Gaz. d. osp.*, Milano, 1903, vol. xxiv., p. 336; also *Rassegno internaz. d. med. mod.*, Catania, 1902-3, vol. iv., p. 107.
Desfosses, P. La legende du roi lépreux, *Presse méd.*, Paris, 1903, vol. ii., annexes, p. 337.
La Statue du roi lépreux, *Presse méd.*, Paris, 1903, vol. ii., annexes, p. 433.
Dyer, I. Leprosy from a Sanitary Standpoint, *Journ. Amer. Med. Assoc.*, vol. xli., p. 1129.
Several Cases of Leprosy, *Journ. Amer. Med. Ass.*, Chicago, 1903, vol. xli., p. 238.
Ebergardt, I. I. Case of Trophoneurotic Leprosy, *Voyenno Med. Journ.*, St. Petersburg, 1903, vol. iii., med. pt., p. 92.
Ehlers, E. Leprosy in the Danish West Indies, *Ugeskr. f. Læger*, Kobenh., 1903, 5. R., vol. x., pp. 841, 865, 889, 913, 1 map.
Les léproseries, *Caducée*, Paris, 1903, vol. ii., p. 277.
Filarétopoulo, G. De la contagion de la lèpre, *Caducée*, Paris, 1903, vol. iii., p. 107.
La lèpre, *J. d. mal. cutan. et syph.*, Paris, 1903, vol. xv., p. 1, 6 pl.
Lésions viscérales de la lèpre, *Progrès méd.*, Paris, 1903, 3 s., vol. xvii., p. 207.
La lèpre et ses modalités cliniques, *Méd. orient*, Paris, 1903, vol. vii., p. 25.
Fordyce, J. A. A Case of Lepra, *Journ. Cutan. Dis. incl. Syph.*, New York, 1903, vol. xxi., p. 236.
Freund, E. Ein Fall von Lepra tuberosa in Triest, *Wien. med. Wchnschr.*, 1903, vol. liii., p. 26.
Freynet, *le père.* Léproserie de Rangoon, à Kemmindine (Birmanie méridionale), établie en 1896, Lyon, 1903, Jevain, p. 31, roy 8vo.
G. La lèpre en Tunisie, *Caducée*, Paris, 1903, vol. iii., p. 74.
Gaucher and **Chiray.** Lèpre d'origine martiniquaise, *Ann. de dermat. et syph.*, Paris, 1902, 4 s., vol. iii., p. 1167.
Gilchrist, H. L., and **Carrol, J.** Leprosy, Rep. Surg.-Gen. Army, Wash., 1902-3, p. 65.
Glück, L. Zur Kenntnis der Paraleprose, *Lepra*, Leipzig, 1903, vol. iii., p. 197.
Zur Kenntnis der Verbreitungsweise der Lepra, *Wien. med. Wchnschr.*, 1903, vol. liii., pp. 1765, 1831.
Glück, L., and **Wodynski, R.** Die Lepra der Ovarien., *Arch. f. Dermat. u. Syph.*, Wien and Leipzig, 1903, vol. lxvii., p. 39, 2 pl.
Guénot. Une observation de lèpre; les résultats de son traitement chirurgical, *Arch. de méd. et pharm. mil.*, Paris, 1903, vol. xlii., p. 449.
Gyubert, I. I. Struggle with Leprosy and Construction of Leprosaria, *Voyenno-med. J.*, St. Petersburg, 1903, vol. i., med. pt., p. 650.
Hager, P. A felsö légutak leprás elvaltozásairól. Leprous Changes of the Upper Air Passages, *Budapesti orv. ujság.* 1903, vol. i., p. 591.
Hallopeau. Lèpre tuberculeuse guérie par l'huile de chaulmoogra, *Bull. Soc. franc. de dermat. et. syph.*, Paris, 1903, vol. xiv., p. 1; also *Ann. de dermat. et syph.*, Paris, 1903, 4 s., vol. iv., p. 32.
Hallopeau and **Jomier.** Deuxième Note sur un cas de poussées, lépreuses aiguës avec localisations sous-cutanées nodulaires et lymphangitiques, *Ann. de dermat. et syph.*, Paris, 1902, 4 s., vol. iii., p. 1132.
Hallopeau and **Lebret.** Périostoses craniennes chez un lépreux, *Bull. Soc. franc. de dermat. et syph.*, p. 214.
Hassler. Lèpre atténuée ou mal rouge de la Guyane chez un Européen, *Caducée*, Paris, 1903, vol. iii., p. 19; also *Gaz. hebd. de sc. méd. de Bordeaux*, 1902, vol. xxiii., p. 603.
Hirschberg, M. Einiges zur Differentialdiagnose der Hautlepra, *St. Petersburg med. Wchnschr.*, 1903, n. F., vol. xx., p. 169.
Einiges zur Lokalisation lepröser Infiltrate, *Lepra*, Leipzig, 1902, vol. iii., p. 127.
Horford. A Case of Leprosy in London, *Brit. Med. Journ.*, London, 1903, vol. ii., p. 376.
van Houtum, G. Beschrijving van een geslaagde poging om den bacillus leprae te kweeken, *Nederl. Tijdschr. v. Geneesk.*, Amst., 1903, 2 R., vol. xxxix., d. 2, p. 158.
Hutchinson, J. Ætiology of Leprosy, *Indian Med. Gaz.*, Calcutta, 1903, vol. xxxviii., p. 234.
Description of the Dermatitis of Leprosy as Displayed in Different Regions, *Polyclinic*, London, 1903, vol. vii., p. 243.
Leprosy and its Causation, *Indian Lancet*, Calcutta, 1903, vol. xxi., p. 259.
Fish-eating and Leprosy, *Med. Press and Circ.*, London, 1903, n. s., vol. lxxv., p. 559; also *Lancet*, London, 1903, vol. i., p. 1464.
Leprosy in India, *Polyclinic*, London, 1903, vol. vii., p. 13; also *Indian Lancet*, Calutta, 1903, vol. xxi., p. 690.
Leprosy in Kashmir, *Polyclinic*, London, 1903, vol. vii., p. 260.
Notes of a Conversation with a Persian Physician, *Polyclinic*, London, 1902, vol. vi., p. 546.
The Cause of Leprosy, *Indian Med. Rec.*, Calcutta, 1903, vol. xxiv., p. 138.
The Leprosy Question, *Polyclinic*, London, 1903, vol. vii., p. 166.
The Present State of the Leprosy Question in India and Ceylon, *Med. Press and Circ.*, London, 1902, n. s., vol. lxxiv., p. 598.
Hutchinson, J., and **Pernet, G.** The Leprosy Discussion, *Brit. Med. Journ.*, London, 1903, vol. ii., p. 857.

(*To be continued*).

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Original Communications.

NOTES ON THE TROPICAL DISEASES COMMON IN THE ANGLO-EGYPTIAN SUDAN, AND SOME REMARKS ON CERTAIN OF THE NATIVE REMEDIES GENERALLY EMPLOYED.

By Andrew Balfour, M.D., B.Sc., M.R.C.P.Edin., D.P.H.Camb.

Director, Wellcome Research Laboratories, Gordon College, Khartoum.

I have read with much interest Dr. Wellman's paper[1] in the Journal of Tropical Medicine, and note that the editors of the Journal are very desirous of obtaining similar articles from other parts of the Tropics. Accordingly, I have put together a few notes on the diseases most frequently encountered in this part of the world. The majority of them have come under my own observation, and I have added a brief and imperfect account of the therapeutic agents employed by the natives. At the outset it is necessary to indicate that the conditions are very different to those obtaining in Dr. Wellman's part of Africa.

The Anglo-Egyptian Sudan is a huge territory inhabited by many divers races of men, and possessing several types of climate. One could no more scientifically compare the diseases found in the neighbourhood of Suakin with those prevalent in the Khartoum district than one could compare the latter with those occurring in the Bahr-El-Ghazal. On the Red Sea coast the climate is that of a littoral; it is the Northern Sudan climate modified by proximity to the sea. Round about Khartoum there exists, roughly speaking, a desert climate, somewhat modified by the presence of the two mighty rivers which unite immediately to the south of Omdurman. In the Bahr-El-Ghazal we meet with typically tropical conditions—a moist, humid atmosphere, a heavy rainfall, an abundant vegetation, many rivers, and much insect life. Minor differences exist in different parts of the different districts. Elevation above sea-level, as in Kordofan, plays a part, so does the area of cultivated land, as in the Dongola district, so does the presence (Kassala district) or absence (Gezira) of much bush country, so does the proximity to the great water-ways of this part of Africa. The incidence of disease is also affected by the distribution of population. The Northern Sudan, in addition to its Arabic and mixed Arabic and negro population, is peopled by British, Greeks, Italians, Turks, Syrians, Armenians, Egyptians, Copts, Abyssinians, and several other nationalities. Of these, the Egyptians, the majority of them engaged in military service, are the most numerous. The Southern Sudan is the home of the negro tribes—the Dinkas, Shilluks, Nuers, Nyuaks, Niam-niams, and many others. It is hopeless with our present knowledge to proceed to any kind of a classification, and none will be attempted. Dr. Wellman speaks of Angola with eight years' experience of that country. I can only record the results of a little over a year's observations. For all that, one has fortunately been able to see a good deal of the Sudan, and, being in a central position and in charge of a museum to which specimens are, or rather should be, sent from all parts, one has been able to gather some rough idea of the diseases most common in the land, and a brief conspectus of these is all that will be presented here. I follow Dr. Wellman's arrangement, not only because it is a very suitable one, but also for the sake of uniformity.

I.—Diseases Appearing from an Examination of the Blood.

Malaria (native name, *humma* = fever).—All three forms of the malaria parasite have been seen. The most common have the benign tertian and the malignant tertian, the latter appearing as small ring forms and crescents. Quartan is rare and is probably acquired in Egypt or elsewhere, not in the Sudan. Cases from up the Niles, and especially from the White Nile, show the small ring and crescent forms most frequently. Typical ague attacks occur, but are not often seen. Remittent fevers seem to be the rule in the southern districts. Enlarged spleens due to malaria are numerous. Captain Cummins, E.M.C., found a large percentage of children in the Bahr-El-Ghazal affected in this way. A high percentage of large mononuclear leucocytes is frequently found in the blood of natives, or Egyptian soldiers who have served up country. Very few cases have been seen in which such white corpuscles contained pigment. Chronic splenitis sometimes leads to a very considerable enlargement of the spleen. It will be interesting to see if the new blood parasite, *Leishmania Donovani*, is to be found in cases of splenomegaly. Professor Ross has suggested to me that it might be well to look for it in monkeys. The Anophelina, hitherto found by me in the Sudan, are the following :—

Pyretophorus costalis, *Cellia pharoensis*, *Myzorhynchus paludis*, *Myzomyia funesta*, and possibly a *Stethomyia*, n. sp. One or two I have been unable to identify as regards species. Their distribution on the Blue Nile, White Nile, and tributaries of the latter will be indicated in the forthcoming laboratories' report.

Filariasis seems to be rare in the Northern Sudan, although *Culex fatigans* abounded in Khartoum before preventive measures were adopted. I have only seen one case of elephantiasis (*da el feel*). It was in the leg of a Dinka, but his blood showed no filaria embryos.

As *Mansonia uniformis* exists in considerable numbers along the banks of the Blue Nile, south of Wad Medani; in veritable swarms on the White Nile, south of Abbas Island, and all along the Sobat, Baro and Pibor Rivers and the reedy shores of Lake No, one would expect to find abundant evidence of filarial infection. Gross lesions, such as lymph scrotum, chylocele, varicose groin glands, and elephantiasis of the legs are not visible to the passing traveller even if he looks out for them. I had no opportunity of examining the blood of natives, nor, so far as I know, has any work been done on this subject in these regions. Bastian's hypo-

[1] February 15th, 1904.

thesis[1] regarding *Filaria perstans*, recently advanced, has to be considered. The banana is rare in the districts to which I now refer.

Leucocyte Variation.—Excess of large mononuclears has been mentioned under malaria. I have found Eosinophilia in dracontiasis, the percentage of Eosinophiles varying from 6·4 to 36·6. In three cases of bilharzia disease the average percentage worked out at 16·8.

Trypanosomiasis has not been encountered. Trypanosomes probably occur in the blood of natives living close to the more tropical parts of the White Nile. No trypanosomes were found in the blood of several siluroid fish examined. *Glossina palpalis* has not been found in the Sudan. *Glossina morsitans* occurs in the Bahr-El-Ghazal, and is numerous in some parts.

II.—Diseases Appearing from an Examination of the Fæces.

Dysentery (*Dorontaria*) is not very frequently seen. It is probably most common in young British officers. Slight forms, the so-called dysenteric diarrhœas, occur. It seems to be more frequent in the hot weather, when there is a greater change between the day and night temperatures. It is probably amœbic in type, though it is likely that irritating sand particles and chill play a more important part in its production than does the *Amœba coli.*

Ankylostomiasis (*Ankylostoma*).—Common amongst the Egyptian soldiers, and often very severe. Does not seem to be indigenous in the Sudan.

Ascaris lumbricoides (*Tabaan el buttu*).—Common, especially amongst Egyptian soldiers. These fellaheen seem to be very favourite hosts for parasites of all kinds.

Tænia (*Dooda waheeda*).—I have only seen *T. saginata.* Multiple infection occurs.

Oxyuris vermicularis (*Wooda Khatya*).—Very common. Its ova are very liable to be confounded with those of the Ankylostomum. I have found the difference in the shape (the ova of Oxyuris being more curved on one side than the other) to be the best guide.

Trichocephalus dispar has not been met with.

Schistosomum hæmatobium.—Ova with laterally placed spines are common in the fæces of Egyptian soldiers.

Chronic Diarrhœa.—No opinion can be given.

Sprue.—Apparently unknown.

III.—Diseases Appearing from an Examination of the Urine.

Hæmoglobinuric Fever (*Hummet el mayiah el iswid*).—I have only seen one case, and that was in a Greek at Gondokoro, in Uganda; but at Rejaf (Lado Enclave) I met a young Scotchman who had just recovered from a second attack. Although not charted in Scheube's map, blackwater fever does occur in the Sudan. Capt. Rivers, E.M.C., reports that no case has yet occurred north of 10° N. lat. The disease seems confined to the White Nile regions south of Fashoda, and to the Bahr-El-Ghazal province. British officers and Egyptians form the majority of the victims, and since the re-opening of the country these have been few in number. It is, however, significant that the natives of the Gōlo tribe have a special remedy for this disease.

Endemic Hæmaturia (*Bilharzia*).—Of frequent occurrence amongst the Egyptian soldiery. Was supposed not to exist in the Sudan, save such cases as had acquired infection in Egypt or elsewhere. Recently the urines of three Sudanese boys have been sent to the laboratories. All three showed blood, pus and the characteristic ova. Two were brothers. None of the three had ever been out of the Sudan. The chief point of significance lay in the fact that all three drank water from a school well in Khartoum. So far nothing suspicious has been found in this water, though some of it has been centrifuged and examined. The only other water drunk was that from the Blue Nile, the general source of supply for Khartoum. The urines of all the boys attending the school will be examined, for it is rarely that one can limit the probable sources of infection as in these cases.

Captain Ensor reports cases from the Kassala district in Arabs who had presumably not been in Egypt. They may have visited Abyssinia.

Calculus (*Hagga misana*) is common. Soft uratic stones are the rule; but phosphatic and uric acid calculi occur. Much of the underlying strata in the Sudan consists of limestone, and the well waters are hard. Blue Nile water issues from amongst the granitic rocks of Abyssinia.

Pyelitis.—A form of pyelitis, due apparently to the irritation produced by concentrated urine, occurs. I myself suffered from an attack, and found cells from the renal pelvis in my urine, as well as a small quantity of albumen. I regarded the condition as due to chill, but Captain Ensor tells me it is of common occurrence, and to be attributed to the above cause. The symptoms are slight fever, a general feeling of malaise, sharp pricking at the point of the penis, with some spasm towards the end of micturition, and a dull boring pain in the region of the affected kidney. Rest in bed, a milk diet, free flushing, and dry cupping in the lumbar region soon cause relief and cure.

IV.—Diseases Appearing from an Examination of the Sputum.

Pulmonary Phthisis (*Sil rheowé, durran*).[2]—Very common amongst the native Sudanese. No doubt due to the fact that they live in ill-ventilated mud dwellings, the main object of which is to exclude the powerful rays of the sun. Most frequent amongst women and children, as might be expected.

Asthma.—Bronchial asthma seems to be unknown. The dry Sudanese climate is a good one for catarrhal asthmatics. I have known two instances of British officials, previously martyrs to the disease, who have not had an attack since coming to the country, in which they have now been resident for a considerable time.

Gangrene of Lung.—This seems rather common, as is cancrum oris. In one instance the pulmonary gangrene occurred in a case of mycetoma.

[1] *Lancet*, January 30th, 1904.

[2] Where there is both an Egyptian and Sudanese name, the latter is put second.

V.—Diseases Appearing from an Examination of the Skin.

Leprosy (*Goyam*).—Probably occurs all over the Sudan. There are a good many lepers in Omdurman and Kassala. The tuberculous variety seems to be the more common form to judge by the leper photographs sent me by Dr. Christopherson. Fish is largely eaten by dwellers on the Niles, and I understand that the natives are none too particular about its condition. There is said to be leprosy in waterless Kordofan. In this connection one may mention the siluroid fish, which appear there in the rain pools. At other times they lie *perdu* in the sun-baked mud. I do not know if they serve as food. Scarification is practised as a remedy. Very few attempts at segregation have been made, but lepers labour under certain restrictions.

Yaws.—Captain Ensor, who has had considerable experience of this disease in West Africa, tells me that he has seen one undoubted and one doubtful case at Kassala. In both instances children were affected. He suggests that the introduction of the disease into this part of the Sudan is due to the Hausa pilgrims on their way to Mecca.

Dhobie Itch (*Harrara*).—Quite common, especially in the Southern Sudan. Chrysarobin is found the most effective remedy.

Keloids.—Huge keloids occur as the result of syphilitic and other ulcerations. The Sudanese seem specially liable to such disfiguring overgrowths.

Kordofan Sores (*Kurrha*).—These are stated to be of the nature of veldt sores, and occur chiefly on the hands. It will be interesting, in view of Wright's discoveries in connection with Delhi boils, to see if *Leishmania Donovani* exists in the bases of these sores.

Myiasis.—The larvæ of flies are sometimes found subcutaneously in the Bahr-El-Ghazal. No specimens have been sent me. Myiasis is common in the domestic animals, especially the camel, mule and horse.

Leucoderma.—Seems to be rather frequent. May in some cases be the result of syphilitic infection.

VI.—Diseases Detected by a General Examination of the Body.

Beri-Beri.—Doubtful. I saw a case in Omdurman which I suggested might be beri-beri. Dr. Christopherson was inclined to regard it as a neuritis dependent on diet.

In Kordofan there is a peculiar disease, evidently a neuritis, known by the Arabic name for a haltered camel. Is this beri-beri, lathyrism, or the akatama described by Wellman[1] amongst the Bantus?

Sleeping Sickness.—So far unrecorded. As stated, *Glossina palpalis* has not yet been found in the Sudan.

Low Fever.—Occurs. A kind of simple continued fever which is not enteric. May be due to the *B. coli communis*. During the hot weather there is a so-called Khartoum fever, which is fairly sharp, but only lasts a week or ten days. It is not malarial, but it is amenable to quinine. Possibly exposure to the sun and fatigue are the predisposing, if not the exciting, causes.

Malta Fever.—Has been described, but is certainly very rare, at least in its typical form.

Heat Stroke (*Darbit harrarar*).—Not very common, but may be fatal, as in the case of a British soldier last summer. Red or rather orange covering for the head and spinal regions is effective. The small tight skull cap affected by the Arabs is said to be an excellent preventive when worn under the helmet. I found a thick spinal pad very comforting when shooting in the Southern Sudan.

Poisoning.—Infrequent. The blacks employ senna as a purge, followed by a large dose of a native salt called "gardugga." I have analysed this, and found it to consist of the carbonate, chloride, and sulphate of sodium. It caused the death of a Greek, a weakly man, to whom it had been given. The *post-mortem* appearances were like those met with in poisoning from a corrosive alkali. I believe the large dose of sodium carbonate was what killed him. It is said that datura is frequently employed as a poison. I have not seen a single case of death resulting from this drug.

Alcoholic Poisoning from the drinking of excessive quantities of merissa, a beverage made from dura (*Sorghum vulgare*), now and again occurs.

VII.—Local Affections.

Liver Abscess (*Khorag Kabid*).—Not uncommon. Apparently unassociated with dysentery. I have found the *Amœba coli* in the pus in one case—a European. Two out of four cases seen were multiple. In one a superficial abscess was successfully opened and drained, but the patient died from a deeply-seated abscess, which had apparently formed subsequent to operation, and was not detected during life.

Ainhum.—Is said to exist amongst the natives in the south. I have not seen a case.

Goitre (*Gwatre*).—Occurs. I have a photograph of one case (from Dr. Christopherson), associated with exophthalmos, in which the huge goitre has ulcerated and looks as though it were undergoing malignant changes. The patient was an Egyptian woman resident in the Sudan. (As regards water conditions, see under Calculus.)

Hypertrophied Mammæ in Males.—This curious condition exists, but I am told is not so common as in Central Africa. The possessor of these abnormalities has been known to excise them, being angered at the "chaffing to which he had been subjected.

Guinea Worm (*Erk Medain*, *Farranteet*).—Fairly common, and not confined to natives. There are certain pools in both Niles (charted by Major Bray) whence infection may be obtained. It is most common in the foot, but I have seen a Sudanese with multiple infection in the arm.

Cancrum Oris.—Already mentioned. The disease occurred in a chimpanzee, *Anthropopithecus troglodytes* (Schweinfurth), confined in the Zoological Gardens in Khartoum.

Mycetoma (*Napt Hindi Nabit*).—Exceedingly common for such a rare disease. The form due to the black variety of Streptothrix is most frequently encountered, but the yellow or white fungus is also to be seen. The

[1] Journal of Tropical Medicine, September 1st, 1903.

pink variety has not come under my notice. The foot is the part principally affected, but the inguinal glands are often involved, pointing to a spread by the lymphatics. They may break down in the centre, and become what is practically a cyst with pigmented walls. The ankle- and knee-joints may become involved and disintegrated. The Laboratories' Museum possesses a fine specimen of mycetoma of the hand—a case of twenty years' duration in a Nile boatman, aged 65. The source of infection of the disease is unknown. It is worth noting that the Northern Sudan is largely a country of thorn bush.

Jigger.—I have no information as to this pest.

Insect Bites.—Those of sand-flies and owl-midges are often more severe and irritating than those of mosquitoes. The Shilluks on the White Nile have a mosquito plant. They dry the leaves and lay them inside the roofs of their huts. The seroot fly, *Tabanus dorsivitta*, is a plague on both Niles; while Colonel Talbot has recently reported that on the Nile at Abu Hamed there is a biting fly called in the Arabic tongue "Kunteb," which is a veritable terror. It bites fiercely, but, fortunately, not during the night. It will follow its unfortunate victim several miles back from the river. Specimens have been secured, but have not yet reached me. A humorous officer, one of its victims, has likened it to "the misbegotten progeny of a diminutive cock house-fly and a hen Culex." Such a prodigy must be worth seeing, though not encountering, in an active state!

Tick Fever probably exists in the Bahr-El-Ghazal. It is not seen in Khartoum or Omdurman, nor are ticks a nuisance in these places.

Snake Bites.—Rare, considering the large number of poisonous snakes in the country. On the Sobat there is a viperine snake which protects itself by spitting in one's eyes. The venom is very acid, and dries up into small white crusts when ejected on a glass surface.

Leeches (*Alak*).—Common in the swamps of the Southern Sudan. I have found them clinging in dozens to the under surface of a crocodile, and they have been discovered within the beak of a whale-headed stork (*Balinœceps rex*). Those on the crocodile, when dislodged, fastened at once on the feet of the Egyptian who was skinning the reptile.

Eye Troubles.—I cannot say much about these. Cataract and corneal ulcer both occur. I have a specimen of Staphyloma sent by Dr. Christopherson. The Sudanese, as malingerers, sometimes put the milky juice obtained from the "Ushar" plant, *Calotropis procera*, into their eyes, in order to produce inflammation. I have seen women collecting this juice; but whether they employ it to destroy female infants, a use to which it is said to be put in India, I cannot tell. There is much blindness—the result of small-pox.

APPENDIX.

(1) *Epidemics.*

Small-pox (*Gidri*).—Is said to be endemic, and occurs in epidemics. May cause many deaths if unchecked. There was a small epidemic in Omdurman last year. A good many of the cases were confluent and severe. The natives recognise and appreciate the benefits conferred by vaccination.

Cholera (*shota*).—Has reached Wady Halfa. Will probably visit the Sudan from Egypt.

Enteric Fever.—Natives apparently unaffected. The disease is rare.

Chicken-pox (*Gidri Kasib. Borgool*).—Is occasionally seen.

Dengue (*Abul Rukub*).—Not recorded. *Culex fatigans*, said by Dr. Graham[1] to be the intermediate host of the protozoon, is common.

Plague (*Tahun*).—No record of this disease.

Cerebro-spinal Fever.—Occurs sporadically and in epidemics. Some forty deaths in the last outbreak at Omdurman in 1899. Have seen one typical case along with Captain Ensor in a Sudanese. We isolated a small diplococcus from the cerebro-spinal fluid obtained by lumbar puncture during life. It was secured in pure culture, but efforts to inoculate rabbits and a monkey, *viâ* their nasal cavities, proved ineffectual. A rabbit received 1 cc. of a broth culture subcutaneously. Beyond slight fever no illness resulted. The cultural and staining characteristics, such as they are, were positive, and we have little doubt the organism was the *Diplococcus intracellularis meningitidis* of Weichselbaum. The disease did not spread, every precaution being taken.

Typhus (*Humma Typhusick*).—Was once supposed to be common. It is said the Mahdi died of it. His fatal disease was, however, probably cerebro-spinal fever, and typhus is only doubtfully present, if at all.

(2) *Other Diseases Common to all Climates which are Frequent in the Sudan.*

Of these *tuberculosis* (*sil*, *daran*) and *syphilis* (*zhurri halug*) must be mentioned. Their ravages are terrible, especially on the integumentary and loco-motory systems of those affected. Syphilis may also occur in a very mild form and cause little trouble to the patient.

Gonorrhœa is common, and is called *Salan* in Egypt, and *Bagal* in the Sudan.

(3) *Surgical Affections.*

Concerning these I do not feel qualified to speak. All that one would say is that sarcoma and carcinoma both occur, and there have been some cases tending to prove that the native who has never lived in contact with the white man is not immune.

One may also note the frequency of both inguinal and umbilical herniæ.

Native Remedies.

On going round the bazaars and viewing the wares of native hakims it is surprising how many remedies familiar to the British physician are to be found. The Arabs, once pioneers in medical science, have still a considerable reverence for the healing art, and are fond of dabbling in drugs. There is evidently a trade in medicines between Egypt and the Sudan, and between these countries and Syria, Arabia, Persia and India. The negro tribes in the south possess a totally

[1] JOURNAL OF TROPICAL MEDICINE, July 1st, 1903.

different stock of drugs—the product of their own forests and forest lore.

As an example of well-known vegetable medicines in common use we may mention colocynth, senna, jalap, tamarinds, aloes, sarsaparilla, kousso, gall-nuts, tobacco, cannabis indica, hyoscyamus, datura, fennel, cardamoms, cinnamon, cloves, ginger, gum acacia and myrrh. Amongst the inorganic group occur sodium, mercury, alum, zinc, and copper. All these have their place in the British Pharmacopœia. Others of repute, but not honoured in like fashion, are represented by curcuma, the Tebeldi fruit, the resin of *Gardenia thunbergia*, the juice of *Calotropis procera*, salsola, hibiscus, balanites, albizzia and os sepiæ.

The Laboratories' Museum possesses over a hundred specimens of different native remedies. I am unable to recognise many of these, partly because I am not a botanist, and partly because the specimens secured are imperfect. In many instances I have been indebted to Mr. Broun, the Director of Woods and Forests for the Sudan. He has kindly named a certain number, and promised his aid in securing proper samples of those which are at present unrecognisable.

Citrullus colocynthidis, the seeds are called *hanzal*, is a native of the country; so is senna, in the form of *Cassia acutifolia*, *obovata* and *æthiopeca* (Guibourt). The Sudanese are in the habit of following the dose of senna by one of "gardugga," the native "salts" already mentioned in this paper. The combination constitutes a very powerful and favourite purge. Jalaps, as a rule, come from Mexico; but what look very like ipomœa seeds, *mulkat*, can be bought as a purgative in the market at Omdurman. They are probably imported. *Aloe barbadensis* is a native of Northern Africa. Sarsaparilla, derived from a species of smilax, goes by the name of *Eshba mugrabia*, and is used in secondary syphilis. Kousso, in common use as an anthelmintic, consists of the female inflorescence of *Hagenia abyssinica* from Abyssinia, and is mentioned by Bruce in his travels. In the Sudan it is called *Shaw habashi*.

Gall-nuts are called *Afus*, and probably come from Syria. The name *Sekaran* is applied alike to *Hyoscyamus muticus* and *Datura stramonium*. Both occur as common weeds; and *D. fastuosa* is also found. *H. muticus* is very rich in hyoscyamin, and is used as a narcotic and poison. Egyptians make anodyne plasters from the seeds. Datura seeds are frequently used for poisoning purposes in Egypt. The practice seems rare in the Sudan as far as I can gather.

Haschisch is a forbidden luxury, but is to be found in the markets for all that. The Sudanese are not such slaves to the habit as the Egyptians. The other vegetable drugs mentioned do not call for much notice. Very fine *Korarima cardamoms* come from the Galla country. Their botanical source is unknown. The Arabic names for the others are:—

Tobacco—*Tambæ;* fennel—*Schumar;* cinnamon—*Kurfit-el-dam;* ginger—*zingabil* or *Kerfa*. These latter two are employed in so-called "blood-sickness." Myrrh, *Murr Higazi*, besides its ordinary uses, is esteemed as a dressing for ulcers.

Amongst the inorganics we find sulphate of copper used in syphilis; but the chief Sudanese medicine for this disease is tureba—a dark brown powder found in the desert, especially about Berber. It is for the most part very insoluble even in *Aqua regiæ*, but on sublimation it yields a grey mirror on the walls of the ignition tube due to globules of mercury. The percentage present is probably very small. Cones for fumigation are fashioned from it. It is cheap and in great repute.

Turning again to the list of drugs, we find curcuma regarded as a cure for heartburn. *Tebeldi* or *gongoleise* is the huge fruit of the Baobab tree, *Adansonia digitata*, or so-called "cream-of-tartar tree," which is very plentiful round about Roseires, on the Blue Nile, and constitutes a wonderful feature in the landscape. The pulp has a pleasant taste, due to tartaric acid, and is freely used as a diaphoretic, while it is also employed in dysentery. *Samk-abou-Baka*—the resin of *Gardenia thunbergia*—is to be found in every drug dealer's basket, and is valued as a purgative. *Calotropis procera*, "ushar," has been mentioned. *Salsola fœtida* (Dalle) is said to be good for infectious fevers, probably on account of its disgusting odour. *Lalob*, the fruit of *Balanites ægyptica*, is another common purgative, and is also said to be of value in the dressing of wounds. *Arad*, the pods of *Albizzia amara*, are often seen. The plant must be esteemed, as I am credibly informed it serves the purposes of an emetic and astringent, is good for cough and malaria, and can be utilised as a poison! Cuttle-fish bone from the Red Sea is employed as a tooth powder. Blister beetles of the genus *Mylabris* abound in several districts. Certain species contain a considerable percentage of cantharidin, and the natives recognise their vesicating properties.

It is when we leave these better known remedies that we plunge into the realms of mystery and romance. We encounter a powerful aphrodisiac in crocodile fat, while the testicles of the same reptile are in great request as a tonic. Ostrich fat for rheumatism is the Sudanese "old wife" cure, and for those who would become young wives love philtres are not lacking. There is a drug called *Abæ-Akæ* in the Galla country, stated to be a marvellous remedy for malaria. Snake and scorpion woods are common all over the country. They seem to be usually portions of climbing plants, and are no doubt absolutely worthless. In the Bahr-El-Ghazal there is a root called *Kassa* in the Golo tongue, which the natives use in cases of blackwater fever. May this be the *Cassia beareana* of recent fame? The small fragment of root in my possession tells one nothing.

Tili, a powdered red wood, possibly *Terminalia splendida*, is employed in the same region for dysentery. A number of plants are used like arnica for swellings; several are eye remedies, some, like *Butyrospermum Parkii* (butter tree), yield a fruit which is both a food and a medicine. It would be mere waste of time to give the names of these unknown and untested remedies, but the so-called Rubah root, prized for gonorrhœa, is worthy of mention.

Captain Ensor reports that in Kassala it is used as follows: A quantity equal to the weight of a small coin (half a piastre) is powdered and drunk, along with merissa and an equal quantity of the female root,

early in the morning. This officer states that he has seen one case, thus treated, in which there was severe cystitis and sloughing of the whole urethra, so that it is not a harmless remedy whatever its virtues may be. I have not been able to trace its botanical source.

One may conclude this article by recounting a story concerning a native hakim, as the moral it points is the value of keeping up to date in current literature on tropical medicine.

A very fine-looking and intelligent Arab from Sokoto, in Northern Nigeria, one day paid me a visit. His journey to Khartoum had taken him well-nigh a year. It so happened that the week prior to his arrival I had been reading in the *Lancet* an account of leprosy in the very region whence he came. I was thus able to suddenly fire off at him the names of certain foods and drinks common in his country. His surprise and delight knew no bounds. He called on Allah to witness that here indeed was a wonder, and what was more to the purpose he straightway presented the embryo museum with three drugs, which he said were worth a guinea each. Two were curious. One of these, called *Alili*, I have since got from the Blue Nile. It is a portion of a strong-smelling Asclepiad or Menispermaceous climbing plant, and besides being used in cases of headache and dizziness, as we would use ammonia or smelling salts, it is a life test, and as such is applied to the nostrils of a person apparently dead. Should the latter sneeze, he or she is declared to be alive. If no sneeze follows, burial results.

The other, named *Bel-hami*, was a magic remedy for gaining wealth or position, and was in the form of small sticks, each of which had to be exactly the length of the terminal phalanx of the little finger. I was assured that in order to be effective the medicine must be kept with seven pieces of rolled bread. Then if put in the mouth during an audience, with a dispenser of bounties or distributer of important posts, the desired result was infallibly forthcoming. So far I have had no opportunity of finding out whether or not *Bel-hami* is worth a guinea a piece!

I would express my thanks to the several officers and officials I have mentioned for the information and specimens they have at different times given me, and, in addition, must also record the services rendered me by Sadek Effendi and Negib Shedid Effendi, of the Egyptian Medical Corps.

COLD WEATHER MOSQUITO NOTES FROM INDIA—MALARIA IN UMRITZAR AND ITS CAUSES.

By Lieut.-Col. G. M. Giles, M.B., F.R.C.S., I.M.S. (Retired).

(*Continued from p.* 108.)

Further, all operations of this sort should be carried through and completed between the end of one rainy season and the commencement of the next, otherwise the malaria of active engineering operations will be sure to result.

It must be remembered that there is practically no divergence of medical opinion as to the noxiousness of canal irrigation in Indian military cantonments. A few of the older hands, it is true, are still unwilling to admit the truth of the mosquito-malaria theory; but the most sceptical on this point of our administrative chiefs of my acquaintance is at least as convinced as myself as to the perniciousness of canal irrigation, and being a man of strenuous professional zeal has, I feel sure, missed no opportunity of impressing his views on the military authorities.

In making these remarks, I trust it will be clearly understood that I am fully aware that canal irrigation is an absolute necessity of agricultural life for this part of India; but this can be no excuse for tolerating it in military cantonments, or even in civil stations, and in the immediate vicinity of great cities.

In Mian Mir and in other similarly situated places canal irrigation serves no useful purpose whatever beyond the paltry sum coming into the coffers of the Cantonment Fund from the rent of unused land, and the profits of the grass farm.

In spite of this, however, irrigation will die hard. Government would be slow in compensating the depleted Cantonment Fund; the cantonment magistrate[1] would bemoan his devastated public garden; the "Padré," the pretty grove round his church; while all the ladies would be up in arms at the loss of the roses with which they have been accustomed to deck their tables during the few healthy months in which they deign to grace Mian Mir with their presence; and everyone will miss the pleasant greenery that relieves the natural hideousness of a singularly ugly place. But, in spite of all this, the deed must be done unless the military authorities are willing to continue to be wilfully responsible for the avoidable destruction and deterioration of numbers of these scarce and expensive luxuries—our British soldiers. Heaven knows the recruiting sergeant finds it hard enough to catch Thomas Atkins, without our turning him into a cultivation medium for crescents when he is caught.

Let anyone ponder for a moment on the figures quoted, and consider the enormous financial loss to the State involved in the permanent or temporary relegation to the non-effective list of so large a number of our soldiers, everyone of whom costs at least £100 before he is fit to be put on the firing line.

Your readers need hardly be reminded that in the campaign against malaria there are three distinct lines of action, any one or more of which may be simultaneously adopted: (1) Measures tending to diminish the numbers of mosquitoes; (2) measures designed to protect human beings against the bites of mosquitoes; (3) measures designed to protect these annoying, but otherwise naturally harmless, insects from being infected by malaria-stricken human beings.

Either one of these lines of action would alone suffice to "stamp out" malaria from any given locality if it were possible to carry it out to complete success,

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[1] The writer actually knows of a case in which one of these officials opposed a necessary sanitary measure on the ground that "it would cause the death of a number of valuable

that is to say, either by "exterminating" mosquitoes, by keeping human beings continuously under wire gauze protection, or by securing and isolating all cases of human malaria and preventing all access to them by mosquitoes; but in practice it is rarely, if ever, possible to secure complete success.

In an exceptional case, such as that of Ismailia, where the rainfall is insignificant, and the local breeding-places few and easily dealt with, measures of the first class alone may suffice; but as it is out of the question for mankind to devote its entire time and attention to the one problem of avoiding malaria, and equally impossible to secure the isolation of every person infected with the disease, it is obvious that measures of the second and third categories, though of the greatest practical value, can never be expected to secure so complete a success as was scored by measures of the first class in Ismailia.

There may be places in Rajputana, Sind and Beluchistan which might be as easily dealt with as Ismailia by means of "mosquito brigades," and other means designed to "exterminate" mosquitoes; but, for the greater part of the length and breadth of the land the utmost that can be expected is a diminution in the number of mosquitoes of real practical value, but very far from approaching extermination of these pests.

In Northern India, for example, there is no good reason whatever why we should be worried with mosquitoes during the "hot weather," as during those months there are practically no natural breeding places remaining, and the enormous swarms that invade our bungalows have been almost exclusively bred in small domestic collections of water in the gardens and offices belonging to them, all of which might easily be rendered innocuous by half an hour's personal attention once in each week by their occupiers. But in the "rains" it is different, and though by steady attention to detail it may be possible to produce a great and annually increasing improvement, such measures alone cannot be expected to suffice; and the administrator who trusts to deal with malaria exclusively by anyone of the three above-mentioned methods may fairly be likened to the General who takes the field without including in his force an adequate proportion of each of "the three arms of the service"—horse, foot, and artillery.

During 1902 and 1903 there have been conducted in Mian Mir systematic anti-malarial operations, controlled in the first year by Capt. S. P. James, and afterwards by Lieut. Christophers (both I.M.S.). Both these officers are well-known experts in this department of sanitation. From correspondence with Capt. James, I gather that he selected Mian Mir as the scene of his operations because it was an irrigated cantonment, and he thought it would be foolish to recommend the stoppage of irrigation, because life in India depends upon irrigation.

With the latter consideration as regards agricultural India we are in complete agreement, but I cannot see how this affects the case of the cantonment of Mian Mir, which exists not for the prosecution of agriculture, but has been planned and built solely as a residence for soldiers, and within the limits of which irrigation, so far from being a necessity of life, at the very most serves only the æsthetic consideration of facilitating the creation of pretty gardens; for the grass farm, which is by far the least harmful of the irrigated patches within the station, might be removed to a distance of a mile or so from all habitations without any considerable inconvenience.

As has already shown, the fever rate doubled simultaneously with the introduction of irrigation within the cantonment, although it had been going on all round it for years, so that it is fair to suppose that its abolition within cantonment limits only would alone suffice to halve the present fever rate, despite the fact of the entire surrounding country remaining under irrigation.

Within the malarial zone, irrigated cultivation is compatible with health only when combined with thoroughly efficient subsoil drainage; under which circumstances, as has been practically demonstrated by Prof. Celli, on an area of some hundreds of acres in the Campagna, it may even be made an anti-malarial measure; but the physiography of the Campagna is exceptional, and differs *in toto* from that of the plains of India, where the want of sufficient outfall would render subsoil drainage of but little use even if the expense of introducing it were not prohibitory.

For agricultural India, then, I fear that the utmost that can be done is the more stringent application of the already existing penalties for wasting canal water; but this constitutes no defence whatever for tolerating this system of cultivation within cantonments, or in the immediate vicinity of great centres of population.

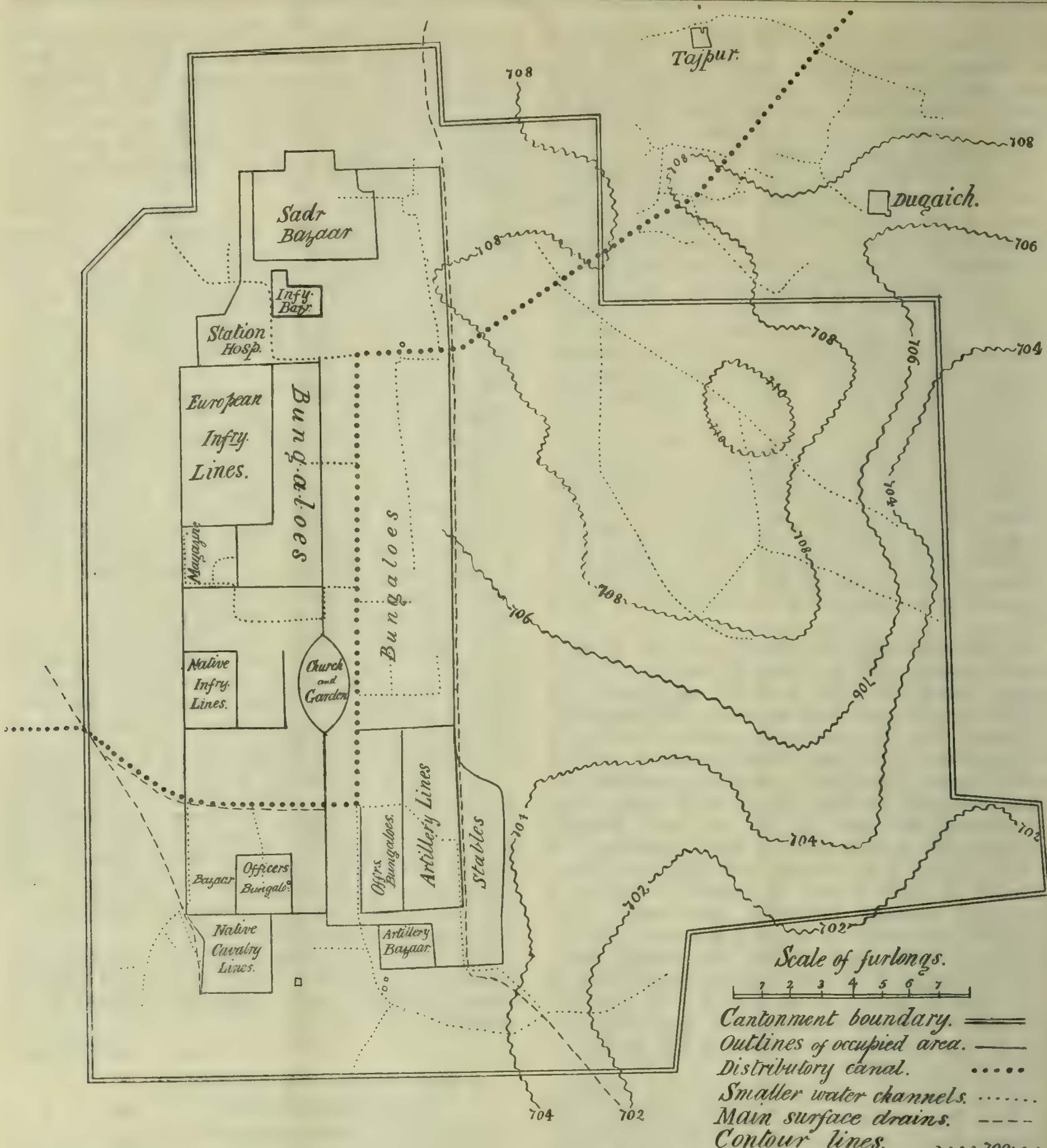
Capt. James commenced operations in the autumn of 1901, with a series of observations on the extent of malarial infection among the native population, and shortly after commenced practical operation with the view to diminish the prevalence of mosquitoes. Only about a quarter of the entire area was dealt with, *viz.*, the artillery lines and bazaar, and the bungalows belonging to this part of the station.

The nature of the steps taken may be most easily realised by the following account of the sums expended during the period Capt. James was in charge of the operations:—

No.	Item.	Amount. R.	A.	P.
1	Wages of coolies at As. 4 each day ..	711	—	—
2	Filling pools — work done by contractors (202,601 cubic feet) ..	596	4	2
3	Unwatering pools—work done by contractors	194	12	0
4	Brick lining and plastering a water-course, length 4,985 feet	5,364	14	6
5	Contingent expenses for kerosine oil, materials, &c., about	350	—	—
	Total Rupees	7,216	14	8

It will be observed that the only at all considerable item of expenditure is No. 4, namely, in rivetting with masonry a considerable length of the rajbaha, or principal irrigation channel.

I have no doubt this step will be of some temporary benefit; but our experience of similarly-constructed surface drains demonstrates that, in the course of a



few years small subsidences are certain to take place, and the last state of the rajbaha will be but little better than its first, as the number of insects that breed in the grass on the sides of these channels while they are flowing is but small. The only permanent method of dealing with these channels would be by carrying the water in large pipes, and as when this had been done, one would have only touched the fringe of the evils resulting from irrigation, I can only regard such expenditure as mere waste of public money, while the simple and comparatively inexpensive plan of doing away with the system, lock, stock and barrel, can be adopted at once, without any trouble whatever.

The only portion of the expenditure that can be regarded in the light of a permanent investment is item No. 2, in which Rs. 596 was spent, or a sum of about £39 sterling. And if our Government expect to secure any perceptible benefits for Mian Mir, or any other place for so small a sum, it must be composed of persons gifted with singularly sanguine temperaments.

All that can be said to have been demonstrated by the anti-malarial operations that have been undertaken

during the last two years is that, even under the conditions of extensive canal irrigation, a perceptible effect on the prevalence of mosquitoes can be effected by a well-considered plan of operations; always provided that the work is personally directed by an expert enthusiast. Even under these circumstances, however, the health of the European troops within the protected area is little, if at all, better than those quartered outside that area; and, in the absence of an expert, enthusiastically devoted to the work, it may be taken for granted that even that little will not be effected. The area taken in hand was barely a quarter of the total of the occupied area in the accompanying map, and even with a most systematic disposal of his time Capt. James was evidently fully occupied in supervising this small area, so that it is evident that to carry out the system thoroughly for the whole of Mian Mir the entire time of at least four expert officers would be required—which would mean a very considerable expense in salaries; while in the way of results it is obvious that at best we can only expect a moderate improvement in the health of the troops on the station.

Sufficient has, I think, been written to show that operations instituted at Mian Mir were not of a character likely to exert any appreciable effect either on the prevalence of mosquitoes or on the incidence of malaria, and hence the question as to whether or not Mian Mir can be rendered a healthy station, by properly planned anti-malarial operations, as yet remains untested. Personally I believe that there is no good reason why it should not be made at least as healthy as any other station in the plains, for it possesses the enormous advantage of being placed at a considerable distance from any considerable aggregation of the native population, and of having under absolute control a considerable area of country.

Lest it be replied that it is much easier to criticise than to suggest better measures, I would recommend that the following steps be taken:—

(1) Canal irrigation should be stopped, and the canals and their appurtenances carefully filled in and obliterated to within a mile of any building occupied by troops or followers.

(2) Every effort should be made to gradually and systematically improve surface drainage, and fill in depressions which may give rise to puddles during the rainy season.

(3) Landlords and tenants should be made responsible for the condition of the premises owned or occupied by them, so that the cost of filling in or otherwise rendering innocuous any puddles capable of breeding mosquitoes, and of cutting and removing undergrowth or other superfluous vegetation found within them, should be recovered from the party responsible, whether the premises be let or unlet.

(4) The system of trenching filth at present in use in military cantonments necessarily gives rise to a large area thickly covered with puddles during rainy weather. The filth should therefore be dealt with either in properly-constructed septic tanks or by deep burial in pits, under which latter system, if properly conducted, only isolated mounds without intervening excavations are left.

(5) All European barracks and all hospitals—whether European or native—should be thoroughly protected with wire gauze on the plan devised by Prof. Celli, a sufficient area of verandah being in all cases included within the protection to admit of there being ample room for the men to lounge in at all times of the day. I believe it would pay Government well to incur the cost of putting native troops also under gauze protection, but there might possibly be some difficulty in securing that the system should be properly carried out. Failing this, however, protection by smoke might be tried, as the Indian seems to glory in a smoky atmosphere, and the plan has already been successfully put into practice in an Indian jail.

(6) Every possible inducement should be offered to native followers and inhabitants of the bazaars to come into hospital for treatment.

(7) Quinine should be distributed gratuitously in the sudder and regimental bazaars to all persons applying for it who are known to be *bona fide* residents.

That these measures will suffice to "stamp out" malaria I do not for a moment pretend, but entertain no doubt that if conscientiously carried out they are adequate to reduce the incidence of malarial affections among the troops in garrison to a comparatively insignificant amount; and would finally point out that the readiest method of testing the question is to put these measures to the test of practical experiment.

PROTOZOAL AND ENTOZOAL INFECTION OF NATIVES OF BENGUELLA, ANGOLA, WEST AFRICA.

By Frederick Creighton Wellman, M.D.

Bihé, District of Benguella, Angola, West Africa.

(This interesting communication was addressed in the form of a letter to the Editors.)

"I send you in the following tables statistics of some microscopical examinations of the blood and excreta of natives not under treatment, made by me personally during 1903, and which may be of interest to your readers as an indication of the frequency of protozoal and entozoal infection among the blacks of this district. I have recorded a few cases where the examinations were negative, but in which the presence of Charcot-Leyden's crystals pointed to the existence of zooparasitic invasion of some sort. I have added to the figures as correlated data the spleen index of 200 untreated natives.

Table I.—Blood.

Number of examinations for malaria	280
,, ,, cases where parasite was found	112
,, ,, ,, showing excess of large mononuclears	91

Note.—When the parasite was found no differential leucocyte count was made.

Number of examinations for filaria	300
,, ,, cases of filariasis	2
,, ,, ,, showing eosinophilia	31

Table II.—Fæces.

Number of fæces examinations		310
,, ,, cases of infection with lumbricoides		158
,, ,, ,,	ankylostomiasis	13
,, ,, ,,	Bothriocephalus latus	4
,, ,, ,,	Tænia saginata	2
,, ,, ,,	Anguillula stercoralis	2
,, ,, ,,	Amœba coli	1
,, ,, ,,	Charcot-Leyden's crystals	3

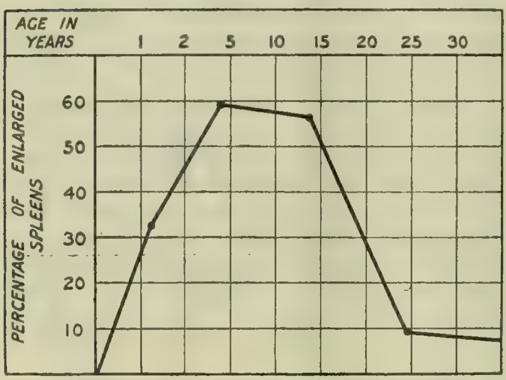
Note.—Daniels, from 251 fæces examinations in British Central Africa, obtained somewhat different figures, viz., lumbricoides, 15; ankylostoma, 25; tænia, 0; anguillula, 3 (*vide* Journal of Tropical Medicine for June 15th, 1901, p. 199).

Table III.—Urine.

Number of urine examinations		72
,, ,, cases of bilharzia disease		3
,, ,, ,,	filaria	1
,, ,, ,,	Charcot-Leyden's crystals	2

Table IV.—Spleen Index.

(150 Children and 50 Adults.)



"In conclusion, I would repeat that the above tables represent but a small part of the records of this hospital, as I have confined them entirely to cases which had never received treatment. The inclusion of cases where quinine and anthelmintics had been administered would, of course, have made the figures valueless.

REPORT OF TWO CASES ILLUSTRATIVE OF SURGICAL WORK IN THE TROPICS.

By Frederick Creighton Wellman, M.D.

Bihé, District of Benguella, Angola, West Africa.

While compiling my reports for the year just past, I particularly noticed records of two surgical cases, which I reproduce here, thinking they may be of interest as types of cases not infrequently seen in Central Africa.

Case 1.[1]—Bone Necrosis, the Result of a Leopard's Bite—Operation—Recovery.

Name.—Katesu.

Age.—Twenty years.

Sex.—Male.

Date of Admission.—November 15th, 1903.

Condition at Time of Admission.—Rather thin and weak from the suppuration which had been going on for weeks. Very discouraged, and convinced that he must die.

History.—Said that seven weeks before I saw him he went hunting in the woods with a companion, when he saw a leopard, which he shot but did not kill. His companion fled and the leopard charged, mauling him in several places with teeth and claws, after which it escaped.

Examination.—Besides a wound in the head, there were scars of a severe bite in the calf of the left leg, and marks of claws on the left heel and buttock, also on his back and chest. The wound on the head was also on the left side, and had largely healed, leaving sinuses: (1) above the ear, (2) into the external meatus, (3) mastoid region, (4) a long burrowing sinus opening in the left occipital region. Examination with the probe revealed rather extensive denudation of bone surface, and consequent necrosis involving the squamous and mastoid portions of the temporal bone.

Operation.—On November 17th, 1903, I removed, under chloroform, a considerable mass of necrosed bone. The head being shaved, an incision was begun behind the ear at a point as far down and back as would just escape the posterior auricular artery. The incision was carried forward and upward to a point near the division of the temporal artery. On pulling the ear downward and forward, the necrosed area was with little difficulty exposed. An exploration forward and downward from above the ear, through a blind sinus, revealed a large spicule of bone, which on removal with the dissecting forceps proved to be a portion of the zygoma. Directing my attention backward, I then thoroughly laid open the mastoid antrum and cells, removing the posterior wall of the meatus to the middle ear. Working now upward into the temporal fossa, I removed with the finger some small scattered pieces of carious bone, besides one larger piece, which on examination was seen to be a part of the squamous portion of the temporal bone. Using the curette where it was safe to do so, and copious irrigation, I cleansed the whole cavity as well as possible, and, leaving the wound open, packed with iodoform gauze.

Subsequent Treatment.—The man was put on syrup of the iodide of iron and cod liver oil. The wound dressed daily.

Result.—The patient gained rapidly in weight, and the wound healed finely by granulation. On December 8th, 1903, he was so well that he insisted on leaving the hospital, although there was still a slight discharge through the ear. With the exception of the small sinus in the upper margin of the meatus, the wound had perfectly closed. I have not seen the man since.[2]

Remarks.—This is the fourteenth case of this kind I have seen. The injuries are sometimes the result of too great familiarity with lions, and some, like the above, are received from leopards. After being caught by lions the victim generally dies from his injuries, or is carried off and eaten *sans cérémonie.* The wounds

[1] This patient was sent me by Mr. Fay, of Bailundo, for operation.

[2] Mr. Fay writes under date of December 21st, 1903: "Katesu is all right. No pus in his ear to-day."

inflicted by leopards are, as a rule, slighter. Septic infection is liable to follow in cases where the patient is not killed outright. The interesting point in the above case is the destruction of bone and exposure of the dura mater, as result of the suppurative process.

CASE 2.—ABSCESS OF THE SPLEEN, PROBABLY MALARIAL IN ORIGIN—OPERATION—RECOVERY.

Name.—Membo.

Age.—Six years.

Sex.—Female.

Date of Admission.—April 3rd, 1903.

Condition at Time of Admission.—Thin, pale, spleen enlarged, tender and hot. Temperature, 102·6°. Decubitis; lays on back, with left leg drawn up. Examination of blood showed moderate infection of malignant tertian parasites. Only the small intracorpuscular ring forms were noticed. No crescents were seen. The result of a differential leucocyte count was as follows:—

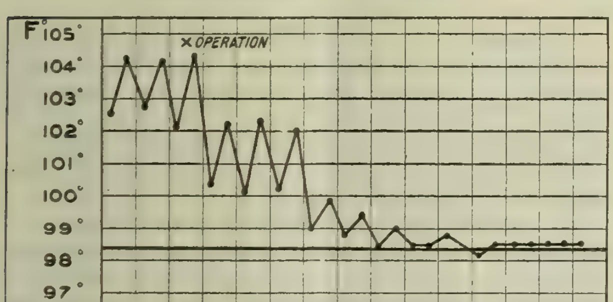
Polymorphonuclear leucocytes	51·5 per cent.
Lymphocytes	22 ,,
Large mononuclear	19·5 ,,
Eosinophile	3 ,,
Transitional	4 ,,

History.—Intermittent and subsequently remittent fevers (she at the time was suffering from remittent fever), rigors, profuse sweatings, fixed pain, loss of appetite and nervous symptoms.

Diagnosis.—As I thought I could detect fluctuation, I aspirated the spleen, and the needle brought pus on the first exploration.

Operation.—The incision was made in the left quadratic space, rather far back, and, on finding adhesions had formed, the abscess was freely opened and drained *à la* liver abscess with a single large tube. A large dressing was put on, and a small dose of brandy given.

TEMPERATURE CHART OF CASE II.



Subsequent Treatment.—Quinine for one week; after that Blaud's pill with arsenic. The dressings changed frequently for the first week. After a few days the tube was gradually shortened.

Result.—The patient was discharged well in three weeks from time of operation.

Remarks.—I have called this case malarial in origin, principally because of the results of the blood examination. I could get no history of traumatism or other cause; but the youth of the patient would make such negative evidence of little weight.

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THE

Journal of Tropical Medicine

APRIL 15, 1904.

BRITISH MEDICAL ASSOCIATION.

Seventy-second Annual Meeting, Oxford, July 26, 27, 28, *and* 29, 1904.

Section M.—TROPICAL DISEASES.

President: ALEXANDER CROMBIE, C.B., M.D., London.

Vice-Presidents: Brig.-Surg.-Lieut.-Col. GEORGE MACONACHIE, Aberdeen; J. W. W. STEPHENS, M.D.

DEAR SIR,—At the forthcoming meeting of the British Medical Association at Oxford, it is hoped that the Section for Tropical Diseases will be as well attended as usual, and that all interested in this branch of medicine will unite to make the meeting a success, both by taking part in the discussions, and by contributing papers.

The following subjects have been selected for discussion:—

Wednesday, July 27.—"Trypanosomiasis." The discussion will be opened by Colonel D. Bruce, F.R.S.

Thursday, July 28.—"The Prophylaxis of Malaria." The discussion will be opened by J. W. W. Stephens, M.D.

Friday, July 29.—"The Significance of the Leishman-Donovan Bodies." The discussion will be opened by Major W. B. Leishman.

The Section will meet on each day at 10 o'clock, when the business will be at once entered upon.

The following gentlemen have already promised to take part in the discussions or to contribute papers: Sir Patrick Manson, Professor R. Boyce, Major C. Donovan, Dr. A. Duncan, Major Mathias, Dr. L. Sambon, Captain E. P. Sewell, Captain Anderson, Captain G. P. James, Dr. S. R. Christophers, and Dr. Sandwith.

We shall be obliged if you will let us know at your earliest convenience if you will be able to take part in any of the above discussions, or if you propose to write a paper on any subject.

Papers bearing on the discussions or otherwise will be read for gentlemen who are unable to be in England for the meeting.

It is also hoped that pathological specimens, drawings, photographs, and microscopic preparations will be lent for exhibition.

We are, dear Sir,

Your obedient Servants,

R. Fielding-Ould, M.A., M.D., *Hon. Sec.*,
94, Mount Street, Berkeley Square,
London, W.

H. E. Annett, M.D., *Hon. Sec.*,
Crofton Lodge, Higher Runcorn,
Cheshire.

Extract from Regulations for the conduct of Annual Meetings of the British Medical Association.

(1) Papers at the Sectional Meetings must not occupy more than fifteen minutes in reading, and no subsequent speech must exceed ten minutes.

(2) The offer of a paper should not be accepted on its title alone, and save under exceptional circumstances no paper should be accepted for reading until it has been sent in to the Secretaries and approved by the Committee of Reference of the Section (the President, Vice-Presidents, and Secretaries).

A SCHEME FOR THE COMPARISON OF CLIMATES.[1]

By W. F. Tyler, F.R.Met. Soc.

Short Abstract.

This interesting and elaborate paper contains what is believed to be the first attempt towards establishing a climatic scale.

The word climate is generally used to indicate, in respect to a particular locality, what is the effect of local conditions generally on persons of varying temperaments. The writer's idea is that the general climate of a place is merely the mean of the daily climates, and the daily climates may vary considerably—a famously bracing place may on some days be distinctly relaxing. So also in regard to bracing-ness. General meteorological conditions will cause a condition of bracing-ness over a large area, but the degree will vary according to local conditions.

As regards the effect of meteorological conditions on human sensation, there are two factors incomparably more important than any others, namely, temperature and humidity, and that with the same sensation of climate, temperature and humidity vary greatly and in accordance with a law. For instance, when the dry bulb of the thermometer reads 77° F., and the wet bulb 76°, the climatic condition, so far as it can be appreciated by the writer, is the same as when the dry bulb reads 90° and the wet bulb 79°.

The writer has been obliged to coin a new word, "hyther," to indicate the joint effect of temperature and humidity. His idea is that a comparison of the hyther of various places—the maxima, minima, and mean quantities—will give the means by which their relative bracing-ness or relaxing-ness can be ascertained. But before this can be done the laws governing hyther must be ascertained.

The observations made were as follows: A number of persons of normal condition and regular habits were requested to estimate daily at noon the degree of "hyther" on a scale of 0 to 10. This word hyther was introduced to indicate the sensation caused by a warm climate, and supposed to be due to the combined effect of heat and humidity.

Ten represents the very worst day an observer remembers to have experienced in Shanghai—hot, damp and enervating; while 0 represents an ideal summer's day—warm, of course, but bright, brisk and bracing, when, suitably dressed, one suffers no discomfort from temperature and humidity.

As far as any conclusion can be come to on the very limited data provided, it would appear that temperature and humidity are certainly the factors of paramount importance in our appreciation of climate, but that some other factor or factors occasionally have appreciable effect. The observations for pressure, wind, nebulosity, &c., do not seem to connect any one of these factors with the irregularities in the hyther numbers.

[1] The paper is published in the *Journal of Balneology and Climatology* of January, 1904.

It seems hardly necessary to explain what use a climatic scale would be, even if one were referring only to hot weather. People familiar with such a scale would be to all intents and purposes possessed of a new faculty. Given the readings of the wet and dry bulbs, they would, by means of a table or diagram, be able to ascertain the degree of hyther, and thereby gain a clear mental perception of the climatic condition referred to.

A Sensation Scale is a means whereby the intensity of a sensation can be named.

In forming a sensation scale two such points are selected as near as convenient to both limits of the range of sensation. The observer is then subjected to this sensation in varying degrees of intensity, and he estimates, say, the decimal fraction of the interval between the fixed limits.

The nature of the mental process necessary to do this is difficult to describe, but once it is allowed that equal differences of sensation is an existing fact, the chief difficulty in conceiving the idea of the subdivision of sensation between two limits is surmounted.

It is not maintained that the intervals between divisions of the scale represent equal amounts of sensation, but that they represent equal differences of sensation, *i.e.*, similar appreciations of change.

But whatever the nature of the mental process, the faculty of using it exists, at all events in some people. The writer's observers and himself, in estimating the degree of discomfort from climatic causes, *tried* to estimate the decimal fraction of the maximum discomfort. Considering the short period and the few observers the results showed an extraordinary conformity.

Review.

PRACTICAL MEDICINE: A MONTHLY RECORD OF THE PROGRESS OF MEDICAL SCIENCE, ESPECIALLY IN DIAGNOSIS AND TREATMENT, is the title and stated purpose of a medical journal published in Delhi, and edited by Ram Narani, I.M.S. (retired).

This journal has entered the second year of its existence, and gives every indication of a useful and profitable future. It is but a few weeks ago that we noticed an Indian Medical Journal quite recently started, and now we are made acquainted with yet another. We are glad to see publications of the kind in India, and we should be sorry were their multiplication to prove financially antagonistic the one to the other; for the clinical opportunity is so large and the area to be covered so extensive, that from a clinical record point of view it is well nigh impossible to have too many such publications. The purpose of each should be to record the clinical experiences and the prevalence of diseases in the more immediate neighbourhood, and of this form of literature we can hardly have too much.

The issue of *Practical Medicine* before us is that of February, 1904. In it B. K. Mittra gives useful and practical hints on the examination of urine; Diwan Ali records an interesting case of "Stone in the Rectum," and the Editor contributes replies to queries on several practical points, his article on "Enlarged Liver in Children" being especially good. Under the heading, "Medical News and Items," "Practical Points and Therapeutic Hints," and "Valuable Prescriptions," the reader will find much to interest and instruct him. We wish *Practical Medicine* success, and we hope to find close attention being paid to the record of cases of clinical interest from the large field of observation offered by the populous districts of which Delhi is the centre.

Notes and News.

MORTALITY from the principal diseases in the Philippines during November, 1903.

Cause.	Total deaths.	Deaths among children under 12 months of age.
Convulsions of children	342	342
Pulmonary tuberculosis	68	0
Acute bronchitis	65	62
Eclampsia, non-puerperal	58	58
Chronic bronchitis	41	29
Beri-beri	36	0
Meningitis	33	33
Congenital debility	28	28
Chronic diarrhœa and enteritis	25	8
Dysentery	24	3
Asiatic cholera	23	0
Malarial fevers	16	2
Puerperal septicæmia	12	0
Cerebral hæmorrhage	10	0
Typhoid fever	8	0
Tetanus	7	4
Small-pox	2	0
Bubonic plague	2	0
Leprosy	1	0
Diphtheria	1	0

Of the above, convulsions, eclampsia and tetanus caused 404 deaths amongst children during the first year of life; of these 158 occurred within thirty days after birth. Trismus neonatorum is not included in the category of ailments, but we should think it is the chief cause of mortality amongst infants; and it would be well were the Board of Health in Manila to recognise the disease in their nomenclature.

BERI-BERI AND SCURVY.—In the provincial jail at Albay, Philippine Islands, an outbreak of beri-beri and scurvy have occurred simultaneously. In view of the etiology of beri-beri this is an interesting observation. Many factors point to beri-beri having a scorbutic origin.

DAVID CHAS. REES, M.R.C.S., L.R.C.P., formerly Medical Tutor at the London School of Tropical Medicine, has received a medal (West Africa) with clasp in connection with his services with the West African Frontier Force.

We congratulate Mr. Rees upon the honour conferred upon him.

Death from an Over-dose of Quinine.—In *Le Caducée*, March 19th, 1904, a death is reported after ingestion of 240 grains of sulphate of quinine. The symptoms declared themselves in two minutes, the patient rapidly fell into a state of coma and died in a few hours.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis.

Branch, C. W. *British Medical Journal*, March 5th, 1904.—Dr. Branch gives 30 grs. of thymol in powder at 4, 6, 8, and 10 a.m., on an empty stomach, followed by an ounce of castor oil at 6 p.m. This quantity is given regardless of age.

Cholera.

Zur Differenzierung des Cholera-vibrio von Artverwaudten Vibrionen, by R. Kraus. *Wiener Klinische Wochenschriff*, Vienna, vol. xvi., No. 49.—According to Kraus the cholera vibrio differs from all other allied bacteria inasmuch as it does not produce hæmolysins.

Hæmoglobinuric Fever.

Hearsey, H. *British Medical Journal*, March 5th, 1904.—Hearsey gives a mixture containing 10 grs. of sodii bicarb. and 30 minims liquor hydrargyri perchloridi every two hours for the first twenty-four hours, and subsequently every three hours in cases of hæmoglobinuric fever until the hæmoglobin disappears from the urine. The *rationale* of the exhibition of this mixture is that it is antacid, diuretic and disinfectant. The food during the attack consists of milk, meat juice, essence of chicken. Brandy is the best stimulant, and barley water the best drink.

Hæmorrhagic Septicæmia in Animals.

Woolley, P. C., and Jobbing, J. W., report on hæmorrhagic septicæmia, which has caused great destruction of cattle in the Philippines. In the outbreak the characters of the microbe have been as follows: Short bacilli with rounded ends, polar staining, occasionally encapsulated, and non-motile; non-liquefying, non-Gram staining, growing invisibly on potato, not producing gas, not coagulating milk or reducing litmus, producing indol and nitrites, and not forming spores. It is an organism which corresponds closely with the bacilli of hæmorrhagic septicæmia of Hueppe, and especially with that member of the group called *B. bovisepticus* (Kruse), *B. bovisepticum* (Kruse-Migula) *B. plurisepticus* (Kitt), *B. bipolare multocidum* (Kitt), *B. der buffe seuche* (Oreste-Armanni), &c. The chief differences between the present bacillus and those described in the literature are its indol production, which is invariable, and its invisible growth on potato, which also appears constant.

Hepatic Bilioseptic Fever.

Scurano, P. *Gionale Internazionale delle Scienze Mediche*, January 31st, 1904.—Scurano draws attention to a form of suppurative (parasitic) hepatic fever, starting in the biliary passages, and causing intermittent febrile attacks. At first the condition closely resembles that set up by hepatitis, but the symptoms develop much more rapidly, the pain is much less, and the illness assumes a grave type quite early in its course. The symptoms also resemble intermittent malarial febrile attacks; but there is no definite periodicity, and a blood examination clears up the diagnosis. There is little, however, to distinguish bilioseptic fever from septic fever.

Plague.

Prevalence of the Disease.

India.—During the weeks ending February 20th and 27th, March 5th, 12th and 19th, the deaths from plague in India amounted to 26,537, 27,858, 28,919, 33,517 and 40,527 respectively. The two last figures placed the mortality from plague higher than ever it has been known before in India. During 1903 the highest records occurred in April, when some 30,000 persons died weekly during three consecutive weeks.

Cape Colony.—During the weeks ending February 20th and 28th, and March 5th, there were no fresh cases of plague in Cape Colony nor any deaths from the disease. During the week ending March 12th, the fresh plague cases numbered 11 (8 in Port Elizabeth and 3 in Uitenhage), and the deaths from the disease amounted to 4 (3 Port Elizabeth and 1 Uitenhage). Rats were found infected with plague in Port Elizabeth and East London.

Transvaal.—On March 20th plague was announced to be prevalent in Johannesburg. Between March 20th and April 5th 128 fresh cases were notified, and 71 deaths from the disease.

Pretoria.—One case of plague reported on April 2nd.

Germiston.—To April 5th, 9 fresh cases of plague, and 1 death from the disease were reported.

Benoni.—To April 5th, 4 fresh cases reported.

Egypt.—On March 18th a case of plague reported at Port Said.

Upper Egypt.—Plague appeared on January 20th at a village opposite to the town of Sohag. Plague has spread in the neighbourhood, and up to April 2nd 206 cases occurred with 163 deaths from the disease.

Mauritius.—During the weeks ending March 10th, 17th and 24th, the fresh cases of plague numbered 3, 2 and 0; no deaths from the disease occurred during these weeks.

Hong Kong.—During the week ending March 12th, 2 cases of plague and 2 deaths from the disease occurred. During the weeks ending April 2nd and 9th, the fresh cases of plague were 3 and 3, and the deaths from the disease 3 and 3 respectively.

Peru.—A telegram dated Lima, April 1st, states that bubonic plague is officially declared to exist in Lima. Forty cases are under treatment at the plague

hospital established in the city. The disease appeared amongst the poorer classes of the community and is confined to the parts of the city where they chiefly congregate. Ships leaving Peruvian ports are not allowed to enter Ecuador ports, and are submitted to twenty-four hours' quarantine on reaching Panama.

Spirilla and Recurrent Fever.

MANSON, SIR PATRICK. *British Medical Journal*, March 5th, 1904.—In a patient from Gibraltar, who had suffered from fever, attended by rigors and profuse perspirations since commencing October 20th, 1903, Manson found spirilla in the blood. No malaria parasites were found in the blood, nor was there evidence of Malta fever, typhoid fever, nor any pyogenic organisms in the blood. Of six films examined, in four spirillar organisms were found. Manson believes that the patient was the subject of spirillum infection; but he is not inclined to think that the disease was that of ordinary relapsing fever.

Surra.

SURRA IN THE PHILIPPINES.—Many forms of cattle disease are met with in the Philippines, especially hæmorrhagic septicæmia, rinderpest, anthrax, foot-and-mouth disease, glanders and surra. Surra has lately been known to attack not only the horses, but the carabao, which were especially introduced from China on account of their supposed immunity to surra. The disease is much less acute in carabao than in horses, and the animals show trypanosomes in their blood although apparently in good health.

Appointments, Change of Station, Leave, &c.

Medical men in practice abroad would find it convenient to send intimation of their movements to appear in this column: also their addresses when in Great Britain.

Dr. R. DANE, Colonial Surgeon, Singapore, has been granted twelve months' leave of absence.

Dr. E. G. Fenton, Senior Medical Officer of Southern Nigeria, has arrived in England on leave.

Dr. J. Hewat has resigned his appointment as District Surgeon of Maitland and Woodstock, Cape Colony.

Dr. W. S. Sheppard has been appointed acting Colonial Surgeon at Singapore.

Dr. J. D. Small, of the Lagos Medical Department, leaves England to-morrow to resume duty after leave of absence.

Dr. G. H. Steyn has been appointed District Surgeon of Maitland and Woodstock, Cape Colony.

Literary References.

LEPROSY—*continued.*

Hyubert, I. I. Care of Lepers, *Protok. zasaid. Kavkazsk. med. obsh.*, Tiflis, 1903-4, vol. xl., p. 44.
Culture of the Bacillus of Leprosy, *Protok. zasaid. Kavkazsk. med. obsh.*, Tiflis, 1903-4, vol. xl., p. 138.
Description of a Case of Lepra Tuberosa, considered Clinically, Pathologically, and Bacteriologically, *Russk. j. kozhn. i ven. boliezn.*, Kharov, 1903, vol. v., p. 511.
Organisation of the Struggle Against Leprosy, *Russk. Vrach.*, St. Petersburg, 1903, vol. ii., p. 1309.

Ivanoff, V. V. Case of Lepra Bacilli in the Animal (Guinea-pig) Organism, *Russk. j. kozhn. i. ven. boliezn.*, Kharkov, 1903, vol. 3, 2 pl.

Jeanselme, E. La lèpre nerveuse, description de ses symptômes, *J. de méd. int.*, Paris, 1903, vol. vii., p. 270.
La statue du "roi lépreux," à Angkor-Tom, *Lepra*, Leipzig, 1902, vol. iii., p. 162.

Jeanselme and **Jacobsohn.** La lèpre à Jérusalem, *Lepra*, Leipzig, 1903, vol. iii., p. 217.

Joseph, M. Zusammenfassende Uebersicht über neuere Lepra-Literatur., *Arch. f. Schiffs- u. Tropen-Hyg.*, Leipz., 1903, vol. vii., p. 172.

Klingmüller, V. Zur Pathologie und Pathogenese der Lepra maculo-anaesthetica, *Lepra*, Leipzig, 1902, vol. iii., pp. 95, 145, 1 pl.

Koike, S. Ueber die Rhinitis leprosa [Japanese text], *Dai Nippon Ji-Bi-In-Ko-Kwa-Kwai Kwai Ho*, Tokyo, 1903, vol ix., p. 331.

Koppel, H. Ueber die Beschäftigung der Leprösen in den Leprosorien, *St. Petersburg med. Wchnschr.*, 1903, vol. xx., p. 359.

Kupfer, A. Ueber die Verbreitung und Bekämpfung der Lepra in Estland, *St. Petersb. med. Wchnschr.*, 1903, n. F., vol. xx., p. 53.

Laurent, E. La lèpre en Birmanie, *J. d. mal. cutan. et syph.*, Paris, 1903, vol. xv., p. 161, 10 pl.

Lèpre, La, in Kabylie, *Rev. med. de l'Afrique du Nord*, Alger, 1903, vol. vi., p. 1989.

Leprosy in India, *Indian Lancet*, Calcutta, 1903, vol. xxi., p. 937.

Leredde and **Pautrier, L.** Diagnostic de la lèpre par l'examen bactériologique du mucus nasal après ingestion d'iodure de potassium, *Compt. rend. Soc. de biol.*, Paris, 1902, 11 s., vol. iv., p. 1363.

Lie, H. P. Report of the Leper Hospital (Pleiestiftelsen No. 1) in Bergen for the three years 1899-1901, *Lepra*, Leipzig, 1903, vol. iv., p. 10.

Logashkin. Contagiousness of Leprosy, *Russk. med. vestnik.*, St. Petersb., 1903, vol. v., No. 10, p. 1.

Loir, A. A propos des léproseries, *Caducée*, Paris, 1903, vol. iii., p. 291.

McDonald, J. T. A Diagnostic Examination of One Hundred and Fifty Cases of Leprosy, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xl., p. 1,567.

McFarland, J. Some Notes on the Bacillus Lepræ, *Med. Bull.*, Phila., 1903, vol. xxv., p. 48.

Mantegazza, Umberto. La lepra nella provincia di Cagliari, Firenze, 1903, L. Nicolai, 155 pp., 7 pl., 8vo.

Mantella, G. Contributo clinico alla casuistica della lepra mutilante, *Riforma Med.*, Roma, 1903, vol. xix., p. 1041.

Marchello, S. Studio sulla tossicità del siero di sangue e dell' urina dei lebbrosi, *Rassegna internaz. d. med. mod.*, Catania, 1902-3, vol. iv., pp. 110, 126.

Martin, S. C. Segregation of Lepers, *Am. J. Dermat. and Genito-Urin. Dis.*, St. Louis, 1903, vol. vii., p. 257.

Moss, Mary. What Science is doing for the Leper, *Amer. Journ. Nursing*, Phila., 1903, vol. iv., p. 81.

Moulinier. Lèpre observée dans la région de Lang-son (Tonkin) parmi les populations de race Tho, *Arch. de méd. nav.*, Paris, 1903, vol. lxxix., p. 213.

Musser, J. H. A Case of Leprosy, *Wisconsin Med. Journ.*, Milwaukee, 1903, vol. i., p. 249.
Report of a Case of Leprosy, *Univ. Penna. Med. Bull.*, Phila., 1902-3, vol. xv., p. 450.

Nascimento Gurgel. Um caso de lepra anaesthesica. *Brazil-med.*, Rio de Jan., 1903, vol. xvii., p. 156.

Nash, J. T. C. The Etiology of Leprosy, *Brit. Med. Journ.*, London, 1903, vol. i., p. 50.

Native Christians in Indian Leper Asylums, *Polyclinic*, London, 1903, vol. vii., p. 223.

Neumann. Fall von Lepra mixta, *Wien. klin. Wchnschr.*, 1903, vol. xvi., p. 683.

Ohmann-Dumesnil, A. H. The Treatment of Leprosy, *Journ. Amer. Med. Assoc.*, Chicago, 1903, vol. xl., p. 1351; Discussion, p. 1635.

Oppenheim, M. Das Lepra-Asyl Matunga in Bombay, *Wien. klin. Wchnschr.*, 1903, vol. xvi., p. 615.

Oudin. Lèpre tuberculeuse traitée par les rayons X., *Ann. d'électrobiol, &c.*, Paris, 1903, vol. vi., p. 88; also *Rev. internat. de la tuberc.*, Paris, 1903, vol. ii., p. 91.

Pernet, G. A Note on the Number of Leper Houses in Europe in Mediæval Times, *Lepra*, Leipzig, 1902, vol. iii., p. 143.
Leprosy, *Quart. Rev.*, London and New York, 1903, vol. cxcvii., p. 384.
Pitres, A. La lèpre en Gironde à notre époque, *Gaz. hebd. d. sc. méd. de Bordeaux*, 1902, vol. xxiii., p. 627; 1903, vol. xxiv., pp. 2, 14.
Plehn, A. Ueber eine lepra-ähnliche Krankheit im Kamerungebiet, *Arch. f. Dermat. u. Syph.*, Wien and Leipzig, 1903, vol. lxiv., p. 1, 3 pl.
Powers, L. M. Case of Leprosy in Los Angeles, Cal. Pub. Health Rep. U.S. Mar. Hosp. Serv., Wash., 1903, vol. xviii., p. 1884.
Proskuryakoff, S. F. Leprosorium in Bombay, *Russk. j. kozhn. i ven. boliezn.*, Kharkov, 1903, vol. v., pp. 107, 279.

Raynaud, L. La lèpre dans l'Afrique du Nord; l'invasion lépreuse en Algérie, *Bull. méd. de l'Algérie*, Alger, 1903, 2 s., vol. i., p. 177; also *J. d. mal. cutan. et syph.*, Paris, 1903, 6 s., vol. xv., p. 561; *Caducée*, Paris, 1903, vol. iii., p. 88; *Bull. med. de l'Algerie*, Alger, 1903, 2. s., vol. i., p. 222.
Razlag, A. Treatment and Cure of Leprosy in South China, Public Health Report U.S. Mar. Hosp. Serv., Washington, 1903, vol. xviii., p. 142.
Reid, A. P. Leper Hospital at St. Jago de la Vega, *Maritime M. News*, Halifax, 1903, vol. xv., p. 132.
de Riemer. De St. Kornelis-Kapel en Leprooshuis aan het zieke, *Geneesk Courant*, Amst., 1903, vol. lvii., pp. 265, 273.
Rieshetillo, D. F. Is the Nervous or Maculo-anæsthetic Form of Leprosy Contagious? *Russk. Vrach*, St. Petersburg, 1903, vol. ii., p. 593.
Public Prophylaxis of Leprosy, *Russk. j. Kozhn. i ven, boliezn.*, Kharkov, 1903, vol. v., p. 657.
Several Cases of Leprosy in the Newborn and their Importance in the Question of the Heredity of Leprosy. *Rôle* of Heredity in the Diffusion of Leprosy, *Russk. j. Kozhn. i ven. boliezn.*, Kharkov, 1903, vol. v., p. 643.
Rouget. Lèpre nerveuse; taches érythémato pigmentées, bulle de pemphigus, ulcérations; dissociations de la sensibilité, puis anesthesié complète; traitement par l'huile de chaulmoogra; amélioration apparente, *Bull. et mém. Soc. méd. d. hôp. de Paris*, 1903, 3 s., vol. xx., p. 860.

Sabathu Leper Asylum, annual report, *Indian Lancet*, Calcutta, 1903, vol. xxii., p. 329.
Sadikow. Zur bevorstehenden staatlichen Controlle über die Leprakranken, *St. Petersb. med. Wchnschr.*, 1903, n. F., vol. xx., p. 21.
Sakurane, K. Ueber die histologischen Veränderungen der leprösen Haut, *Beitr. z. path. Anat. u. z. allg. Path.*, Jena, 1902, vol. xxxii., p. 563.
Sanson, A. Le lèpre au moyen-âge, quelques indications sur le cérémonial de la séparation des lépreux, *France méd.*, Paris, 1903, vol. i., p. 301.
Sewage Disposal at a Leper Asylum in India, *Sanitary Record*, London, 1903, n. s., vol. xxxi., pp. 469, 494; 539, 1 pl.
Shoemaker, J. V. A Case of Tubercular Leprosy, *Proc. Phila. Co. M. Soc.*, Phila., 1903, vol. xxiv., p. 1; also *Med. Bull.*, Phila., 1903, vol. xxv., p. 43.
Stefansky, W. K. Eine lepraähnliche Erkrankung der Haut und der Lymphdrüsen bei Wanderratten, *Centralbl. f. Bakteriol.*, &c., 1 Abt., Jena, 1903, vol. xxxiii., p. 481, 1 pl.
Sugai. Ueber die eitrige Entzündung bei Lepra tuberosa, Ausz., Hft. 6 (Japanese text), *Mitt. d. med. Gesellsch. zu Tokyo*, 1903, vol. xvii., p. 222, 1 ch.
Symposium on Leprosy, *Proc. Phila. Co. M. Soc.*, Phila., 1903, vol. xxiv., p. 1.

Thiroux. Contribution à l'étude de la contagion et de la pathogénie de la lèpre, *Ann. d'hyg. et de méd. colon.*, Paris, 1903, vol. vi., p. 564.
Lésions ainhiques dans un cas de lèpre authentique, Présence du bacille de Hansen dans le mucus nasal, *Ann. d'hyg. et de med. colon.*, Paris, vol. vi., p. 562.
Thorpe, V. G. Case of Leprosy at Wei-hai-wei, Shantung Province, China, *Journ. Trop. Med.*, Lond., 1903, vol. vi., p. 2, 1 pl.
Tonkin, T. J. An Analysis of 220 Cases of Sudanese Leprosy, *Lancet*, Lond., 1903, vol. i., p. 1077.
Some General and Etiological Details concerning Leprosy in the Sudan, *Lepra*, Leipzig, 1902, vol. iii., p. 134.
Tucker, E. F. G. A Contribution to the Discussion on the Etiology of Lepra, *Indian Med. Gaz.*, Calcutta, vol. xxxviii., p. 236; also *Indian Lancet*, Calcutta, 1903, vol. xxi., p. 830.
Turner, G. Special Reports on Leprosy, *South African Med. Rec.*, Cape Town, 1903, vol. i., p. 101.
Vliiyeff. Pseud. Observations of a Leper, *Feldscher*, St. Petersburg, 1903, vol. xiii., p. 176.
Virshillo, V. L. Leprosy in Krasnoy-Yar., *Vestnik. obsh. hig., sudeb. i prakt. med.*, St. Petersburg, 1903, part 2, p. 354.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

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Original Communications.

DIPHTHERIA IN THE TROPICS.

By Dr. Aldo Castellani.
Director Bacteriological Institute, Colombo (Ceylon).

It is generally admitted by the writers of Tropical Medicine that diphtheria is infrequent in sub-tropical countries and extremely rare or absent in the Tropics, and that when it occurs there it mostly exhibits a mild character. The disease occurs in the northern parts of Africa, Tunis, Tripoli and Egypt. The cases recorded are generally of a benign form. In South Africa the disease become much more frequent.

In Central Africa, Uganda and British East Africa, according to the careful investigations of Cook and Moffatt, the disease seems to be absent. During the time Low and myself remained in Uganda and British East Africa we did not come across a single case. Still I would not affirm with certainty that the disease is there totally absent. In Cameroon also it was believed that diphtheria is absent; but recently F. Plehn described a small epidemic of diphtheria, and the clinical diagnosis was confirmed in all cases by the bacteriological examination.

The tropical and sub-tropical parts of America, according to the data so thoroughly collected by Clemow, show very few cases of the disease. In Mexico it is very rare, and also in Central America, West Indies and British Guiana. Throughout the tropical and sub-tropical parts of Asia, diphtheria is apparently exceedingly rare. No case has ever been reported from Siam.

It is met with exceptionally in the Malay peninsula and Straits settlements. The disease was considered very rare in China, though lately a few cases have been reported by different authors. In Java it is quite unknown. As regards the presence of diphtheria in India, a very interesting paper has been published recently by Captain F. W. Cornwall, who describes a case of diphtheria which occurred in the Madras Presidency, from which he grew the Kleb-Löffler bacillus. I gather from his paper that, judging from the cases reported, diphtheria is apparently extremely rare in India. In fact, at the beginning of his paper, Captain Cornwall states that till now there has been a tradition to the effect that diphtheria is a disease that does not occur in many provinces of India—for instance, in the Madras Presidency. In the annual report of the Sanitary Commission with the Government of India only three cases are recorded for the year 1901. Captain F. W. Cornwall is inclined to believe that the disease in India is more prevalent than was surmised hitherto, and has suggested a thorough collective investigation. In Ceylon several authorities are of the opinion that diphtheria does not occur, and that the few cases met with are only imported cases. This hypothesis cannot hold good. As far back as 1901 Dr. Perry, together with Dr. de Silva, observed a small epidemic of the disease at Polwatte, and the usual measures to circumscribe the disease were taken with very successful results. In one of these cases the bacteriological examination taken by Dr. Fernando and Dr. J. de Silva gave a positive result. In the same year Dr. Thomaz performed tracheotomy on two other cases of diphtheria. In 1902 and 1903 several cases of suspected diphtheria were reported, but the bacteriological examination gave constantly negative results. It may be of interest to report a case which I observed a few weeks ago, and which completely confirms the observations of Drs. Perry, Fernando, and de Silva.

N. H., girl, aged 7, daughter of European planter. She lived lately with her parents at Mutwal, a native quarter of Colombo. She has never been out of Ceylon. When I examined her, at the request of Dr. Loos, to whom I am much obliged for the information given to me, the child had been ill three days, there was increase of temperature, the pulse was very frequent and of very low pressure. On the surface of the tonsils, and the arch of the palate and the uvula, were spots covered with a dirty greyish white coating firmly adherent to the mucous membrane. There was a distinct swelling of the lymph glands at the angle of the jaw. The local and constitutional symptoms became rapidly worse, and the child died a few hours after. No *post mortem* was obtained. The clinical symptoms pointed clearly to a diagnosis of diphtheria. The bacteriological examination proved that diagnosis to be right. With the usual precautions I took a swab from the throat of the little patient. Cover glass preparations made at once and stained with Löffler methylene blue showed some rare bacilli; these were not decolorised by Gram's method.

In the usual way I rubbed the swab over the surface of three blood serum tubes, which were incubated at 37° for fifteen hours, after this time the serum showed abundant cream-coloured colonies, tending to be somewhat flattened with regular margins.

Preparations from these colonies stained with methylene blue showed bacilli, the majority of which were of medium length; but some were long, club-shaped and spindle-shaped. Gram's method was positive. Neiser's stain was also used. This showed the presence of well-marked metachromatic granules. Subcultures from the serum tubes were made in bouillon, gelatine, glycerine, agar, &c. In glycerine agar plates the well-known markedly crumbly colonies were observed. In all the other media also the growth was typical of *B. diphtheriæ*. The indol reaction was easily obtained in peptone water cultures after some days' growth. The cultivation in neutral litmus agar showed an acid reaction. To test the virulence of the germ 1 ccm. of a bouillon culture twenty-four hours old was inoculated subcutaneously in a guinea pig. The guinea pig died after nine hours. At the place of the inoculation there was an area of whitish infiltration surrounded by hæmorrhagic œdema. This experiment proves that the organism was very virulent, because guinea pigs inoculated in that way seldom die before twenty to twenty-four hours have elapsed. This experiment proves also that the micro-organism was really a true diphtheria bacillus and not a pseudo-diphtheria bacillus. The presence of metachromatic granules and the production of acids were of course also in favour of the

germ being a true diphtheria bacillus, still these characters have much less importance than the inoculation in animals.

To sum up, a child who had never been out of Ceylon presents all the clinical symptoms of diphtheria and dies in a few days. The bacteriological examination shows the presence of a virulent Kleb-Löffler bacillus, which kills the guinea pig in a few hours; it is then certain that this was an indigenous case of true diphtheria. This case, together with the previous observations of Perry, Fernando and de Silva in Ceylon, and Plehn, Cornwall, &c., in other parts of the Tropics, tend to demonstrate that diphtheria is not limited simply to the temperate and sub-tropical zones, but it is a true cosmopolitan disease, as it occurs also, and probably much more frequently than hitherto supposed, in tropical countries. The different climatic conditions may, perhaps, influence in some instances the characteristic clinical features and course of the disease, and this, if a bacteriological examination is not taken, may render difficult the diagnosis, and lead to some cases being overlooked.

REFERENCES.

(1) J. W. Cornwall, "Diphtheria in the Madras Presidency," *Indian Medical Gazette*, No. 1, 1904.
(2) Clemow, "The Geography of Disease," Cambridge, 1903.
(3) Davidson, "Hygiene and Diseases of Warm Climates," London, 1893.
(4) Hewlett, "Bacteriology," London, 1902.
(5) Manson, "Tropical Diseases," London, 1903.
(6) Perry, "Ceylon Medical Report for the Year 1901."
(7) Scheube, "The Diseases of Warm Climates," Edited by J. Cantlie, translated by P. Falcke.

DEEPLY PLACED CERVICAL TUMOUR; ENUCLEATION; RECOVERY.

By J. Wishart Kerr, M.B., Ch.B.
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The photograph shows a very extraordinary growth which had been increasing in size since the patient, aged 18, was a little girl. The whole right side of the face had hypertrophied in order to carry the weight of the tumour. The skin was greatly thickened, the platysma was quite half an inch in thickness, and the deep cervical fascia was almost tendinous. The tumour bulged into the mouth, the floor of which was completely gone. The tongue was pushed over to the left side, and the buccal cavity was so fully occupied by the tumour that eating was becoming impossible and speech was reduced to inarticulate grunts. Six attempts had already been made to remove the tumour, but they were unsuccessful, and the patient accordingly came to Cape Coast Hospital seeking relief.

Operation.—A preliminary tracheotomy was out of the question, there being only one inch between the suprasternal notch and the base of the tumour. Under chloroform an incision was quickly made in the middle line of the neck, commencing from the chin and going down to within two inches of the base of the tumour. The cut was then extended outwards and upwards to the left; the blood-vessels were secured and the platysma and cervical fascia opened up in the same way. Two fingers of an assistant were then inserted between the tumour and the trachea, with instructions to keep the tumour off the wind-pipe. A cut was then made across the right side of the neck as far as the angle of the jaw and the flaps turned up and down. The tumour, which turned out to be a lipoma, was fairly easily shelled out. It was, however, firmly attached to the root of the tongue, and required to be carefully dissected off.

On removal it was found to have been lying over the trachea and close on to the spinal column; it also

extended up behind the pharynx to the base of the skull. The gap left was somewhat appalling. A floor for the mouth was fashioned out of the cervical fascia, the incisions stitched up, and a drainage tube inserted.

During operation the patient was twice rather collapsed, but rallied well. The blood supply to the tumour was very large and the veins had grown almost out of recognition. The anterior jugular was the thickness of an ordinary pencil, and great care had to be exercised in securing all the bleeding points.

After History.—The patient was fed *per rectum* for the first three days. Afterwards a tube was passed along the mouth to the back of the throat and the

patient fed with milk and soup. Two days later the patient fed herself with the feeding cup. The subsequent history was uneventful, the drainage tube being removed on the fifteenth day.

The tumour weighed just a little short of four pounds, and was a typical fatty tumour.

I must express my indebtedness to Nursing Sister Timbrell, who in the absence of qualified assistance was a most efficient help and in the after treatment saved me much trouble.

COLD WEATHER NOTES ON MOSQUITOES FROM THE UNITED PROVINCES, INDIA.

By Lieut.-Col. G. M. Giles, M.B., F.R.C.S., I.M.S.(Retired).

(*Continued from p.* 123.)

Bareilly.

On returning to the United Provinces after the trip to the Punjab, just described, a visit was made to Bareilly, perhaps the most beautiful of all our stations in this part of India. The soil is dry and sandy, so that at this time of the year (early February) very few collections of standing water survive, and I had some difficulty in finding a pool wherein to demonstrate to a medical friend the wintering *Anopheles* larvæ. We had to go some five or six miles before finding the remains of a small marsh which harboured a few, but, doubtless, with better local knowledge, plenty of places might have been met with nearer. Still it is not common to have to search long, and the fact we had to do so suggests considerable health potentialities for the site.

Bareilly owes its beauty mainly to the magnificent clumps of huge feathery bamboos which are so numerous as to form the dominating feature of the landscape, this gigantic grass flourishing better here than anywhere else in the neighbourhood. There is plenty of noble timber of various kinds and large areas of public and private gardens, whose water supply must form fertile breeding grounds for mosquitoes during the appropriate season. These, combined with the congenial shelter for the adult insects afforded by the luxuriant vegetation, must go far to neutralise the material advantages of soil and climate which the place undoubtedly possesses.

Under these circumstances, the anti-malarial sanitation of Bareilly, though by no means an impracticable task, will always be a business requiring constant vigilance and attention. No particularly large permanent works would be required; indeed, it is one of the places where much could be done by a "mosquito brigade," though, to do any good, such an organisation would have to be kept up permanently, the breeding places being mainly small artificial ones, or a sort we can hardly expect to get rid of, and which accordingly would require to be visited at least once every ten days to render them harmless.

That a sufficient success would be obtained, however, to make wire-gauze protection of barracks needless seems very doubtful, but it is needless to remark that nothing of the sort has been attempted, indeed, so far as I can ascertain, no attempt to utilise Professor Celli's invaluable plan of protection has as yet been made, either by the Military authorities or by anyone else in India.

Survival of Larvæ and Pupæ.

I here made the acquaintance of Major Jennings, I.M.S., the Superintendent of the Central Jail, who has been making lately some valuable observations on the life-history of mosquitoes. In a paper published in the *Indian Medical Gazette*, January, 1904, Major Jennings shows that under certain conditions young Culex larvæ survive dessication for several months. The material on which he worked was a naturally-formed mixture of mud and vegetable *débris* at the bottom of a small cemented water tank, which had dried spontaneously from direct exposure to the sun. This tank had swarmed with eggs, larvæ of all ages, and nymphæ, but both the first and the last died, and of the larvæ only those of about two or three days old survived the drying, the freshly hatched and further grown specimens sharing the fate of the eggs and nymphs. This appears to run counter to Celli's observations, who found that pupæ stood drying better than larvæ did, but no doubt one cannot argue from Italy to India as to a detail of this sort, as the climatic conditions of the two countries differ greatly.

In my own experiments, conducted in the cold season of 1899-1900, I found that neither larvæ nor pupæ of the species of Culex which I had to do with could survive dessication, but it must be remembered that these were what I should now call "wintering larvæ," and Major Jennings finds that the mud of any and every tank will not serve, so that it is evident that some special conditions as to speed of drying, exposure to the sun, or what not, must be secured, in order to obtain the result. He succeeded, he tells me, in reviving these small larvæ up to over three months, and we made two attempts to repeat the observation with some of the remaining material, but apparently the limit of resistance had been reached (after six months), for the result was negative. It must be remembered, however, that the mud, scraped up and packed in loose scales in a box within a very dry house, must have been subjected to much more complete dessication than it would have been under natural conditions. We shall doubtless have some light thrown on the nature of the conditions on which success depends, when Major Jennings is able to repeat his observations during the coming breeding season.

Smoke as a Mosquito Destroyer.

Major Jennings has also made interesting observations as to the time of the day at which the male and female mosquitoes respectively issue from the pupa case, which appears to differ for the two sexes, on which we will hope he will publish something shortly. One of the experiments he mentioned to me appears, however, to me of the first practical importance from the point of view of practical hygiene, and consists in the employment of smoke as a protection against mosquitoes.

In the case of Europeans, the plan is, of course, imprac-

ticable, as there are few who would not prefer risking an attack of fever to passing their nights in a smoky atmosphere; but owing to the primitive construction of their houses, Indians and Africans get so habituated to smoke during the colder months of the year, that they become singularly tolerant of it, and appear to suffer no inconvenience from an atmosphere that makes European eyes water. As it is possible to produce a great deal of smoke with little or no flame, it is not difficult to drive off mosquitoes by its agency, even during the hot weather, without perceptibly raising the temperature.

Quite recently, Power, working on the investigation of horse-sickness in Zululand, has found it quite practicable to protect horses from the attacks of the species of *Anopheles* that is apparently instrumental in conveying that disease, by keeping up a smoke in their stables during the night, and it is obvious that the method is equally applicable to the protection of human beings from malaria in the case of races to whom a smoky atmosphere has ceased to be objectionable, and that its adoption in the barracks of native troops quartered in malarial localities and in jails is quite feasible. Major Jennings, I believe, tried his experiment before Power applied the plan to the protection of horses in Africa, and in any case neither had heard of the other's work, so that both are equally entitled to the credit of the idea. The fuel used by Major Jennings was cow dung, and a fire of this was kept up in each ward of the jail, producing so dense a smoke as to give rise to a notion in the minds of passers by that the jail must be on fire. The experiment was made at a time of the year when malaria is not very rife, but attacks, in the protected wards, were distinctly less numerous that in those left unprotected; and it is to be hoped that Major Jennings may be able to put the plan to further trial during the coming malarious season.

Hurdwar.

After leaving Bareilly I visited Hurdwar, the well-known Hindu sacred city, where the Ganges leaves the mountains to commence its long course through the plains of India.

The town is placed on a strip of country immediately at the foot of the hills, known as the Bhabar, consisting almost entirely of a very pervious boulder alluvium. A very large proportion of the enormous volume of water descending from the hills during the rains, disappears into this; to reappear in the form of springs and marshes, in the succeeding or Terai belt. In the presence of large volumes of quickly flowing subsoil water, this stretch of country presents some resemblances to the Roman Campagna, and like it, though healthy for many months of the year, is extremely unhealthy during the malaria season. The greater part of the volume of the Ganges is here diverted by an immense dam which forms the head works of the Ganges canal, and during the construction of these several large excavations had to be abandoned in favour of an alignment more to the west. Naturally enough the beds of these abandoned channels are now permanent marshes, which form at present one of the main resting places for wintering larvæ. Another favourite haunt of these are the backwaters of the Ganges itself, which are very extensive owing to the amount of water left to flow into the river bed being far too small to fill it. The dam, too, necessarily has the effect of holding up the water and deepening the channel above the town, with the result that a rather extensive plain, that intervenes between the hills and the river above the town, has become intensely malarious and the canal bungalow situated there is well known as a most dangerous place of residence, while those on the head works, being almost surrounded with rapidly flowing water, are comparatively healthy.

Irrigation and Malaria.

The vast extent, and the enormous economic importance of our Indian irrigation system, necessitates the canals being watched continuously by European engineers throughout the year. From the very nature of the case the bungalows that are kept up for the accommodation of these officers are always situated in malarious places, and some of them are to be found in truly deadly localities. If there be one class of public building more than another that requires the adaptation of proper wire gauze protection it is the canal bungalow, and no better example of the inertia of our Indian authorities in the matter of anti-malarial sanitation can be given than the fact that they remain just as they were, four years after the method of wire gauze protection has been given to the world. All this while our canal engineers have been needlessly risking their health and their lives, and doubtless numbers of them have every year to be sent on sick leave from malaria contracted while on inspection duty. Considering the unhealthiness and arduous nature of their work they are none too well paid, but the money avoidably wasted by Government in sending even a junior on a year's sick leave would suffice to pay for the instalment of proper gauze protection in half a dozen bungalows. From the nature of the conditions under which they serve, protection of this sort is the only prophylactic measure which can in any way avail the canal officer, and its provision ought to be a necessary feature of the "sealed plan" of these buildings. Any bungalow can, of course, be so protected, but it would be well in future buildings to modify the plan so as to render it more readily adaptable to this plan of protection, by substituting windows for a considerable proportion of the superfluous doors that are such a feature in Anglo-Indian architecture.

My visit to Hurdwar lasted from February 13th to 23rd, and observations made here are of interest as marking the commencement of the close of the season of wintering larvæ. From the beginning of the month the weather had been perceptibly warmer, and stray, active mosquitoes were beginning to reappear in the tents. At Hurdwar a noticeable feature of my collections became the comparative absence of larvæ of medium size. Those taken were mostly either full grown or extremely small, and the numbers of the latter cannot be accounted for by the laying of fresh batches of eggs which, up to the date of writing (the end of March), I have not met with, as would certainly

be the case if the deposition of eggs were actively proceeding. Amongst the larvæ taken, both of Culex and Anopheles, were certain specimens of exceptionally large dimensions, which seemed inclined to sulk at the bottom of the vessel in which they were confined, instead of, as usual, passing the greater part of their time at the surface; but the significance of these bulky individuals must be reserved for a future occasion.

A further sign of the times was the occurrence of numerous empty pupa cases, and on February 16th some pupæ placed in a tumbler under gauze burst and gave issue to a number of individuals of both sexes of *Culex Numeticus*, Noé. Two days after a specimen of *Nyssorhynchus fuliginosus* (Giles), appeared, and it is evident that from this date transformation of the wintering larvæ into imagines proceeds rapidly, as from that time my notes show that the number of larvæ in the pools diminishes steadily, till, by the middle of March, it became quite exceptional to find any in situations where, a month before, they were extremely numerous.

The Appearance of Culex Larvæ.

Until the end of the month there was no evidence of fresh breeding going on, but on the 26th I found a considerable number of Culex larvæ, and on the 29th these began to pupate, the imagines issuing on March 31st, and proving to be those of *C. impellens*, Walker.

The re-appearance of adult mosquitoes in the tents corresponded well with the disappearance of the wintering larvæ, and by the beginning of March they were fairly numerous, though, owing to the nights being still cool, they were too sluggish to be troublesome at night. From this time they steadily increased in numbers till by the end of the month they became both numerous and troublesome.

It is a curious fact, however, that these *Culices* appear to prefer to attack birds to human beings, for though I have as yet slept without the protection of a net, the number of bites I have received is very small in comparison with the swarms that are to be found in my tent, the numbers of which may be gathered from the fact that I captured over 150 this morning with my little collecting net in about ten minutes; and out of a dozen I have dissected all contained not human but avian blood.

As already noted the wintering Anopheles larvæ have been always as numerous, or more so, than those of Culex, and it is quite certain that, like the latter, they have completed their metamorphoses and must be existing somewhere as imagines; but in spite of this practically none are in evidence, for amongst the hundreds that I have taken with my net and destroyed during the last few days only a single male *Mygomyia culicifacies* has been caught.

One day in the beginning of March it rained heavily, and on this occasion I found two ♂ and two ♀ *Nyssorhynchus fuliginosus* in the tents. We were encamped in a mango grove at the time, and it seems likely that the explanation of their appearance on this occasion is that these Anophelinæ prefer to harbour in trees to entering houses or tents, but had been driven out of the shelter they preferred by the rain. However that may be, the fact remains that in this part of India they are only exceptionally met with in houses, until the breaking of the rains, and are even then far less numerous in houses than the extreme commonness of their larvæ would lead one to expect.

As yet I have met with no evidence of their having recommenced breeding, but during my last visit to India I found a few larvæ in a backwater of the Goomti in the beginning of May, so that it may be taken as a fact that a certain, but very limited, amount of breeding does take place during the hot dry months.

Wintering Larvæ.

As the outcome of the observations made during the past cold weather the principal point established is the quite unexpected prominence of wintering larvæ as a means of tiding over the unfavourable months, during which breeding by the rapid succession of generations is impossible, especially in the case of the Anophelinæ. That large numbers of adults supplement this method, by passing the winter in a more or less torpid condition, there can be no doubt, as at no time were adult mosquitoes absent for any length of time, but, all considered, it appears probable that the hybernation of adults has a smaller share in the perpetuation of the species than the wintering of their larvæ; and, in any case, a very large proportion of the adults in existence just before the recommencement of active breeding must have tided over the unfavourable season in this way.

Importance of Destruction of Wintering Larvæ.

From this it follows that the systematic destruction of wintering larvæ is a prophylactic measure of the first importance, as, by doing so, we destroy perhaps more than half the possible parents of the broods of the coming year. The wintering larva, it must be remembered, passes three or four months in that stage of existence, in climates such as this, and as a single treatment with kerosene or other larvicide will suffice for each harbouring place of the larvæ—applied at any time during that period—it is obvious that a single intelligent man, working systematically, would be able to clear a very large area of all larvæ during the period.

The continuous treatment of all breeding places throughout the year is, of course, a rather expensive business, and during the rains can only be efficiently carried out by a considerable labour force, working as a "mosquito brigade." To be efficiently carried out, it requires, too, a great deal of intelligent supervision, which is always a further source of expense; but a single fairly-educated man, such as one of the "hospital assistant" class, carefully trained to the work, should, with the assistance of one or two coolies, be able to destroy practically all wintering larvæ near the large centres of population in a district, and also make some impression on those situated near some of the larger villages. There can be little doubt that the systematic destruction of so large a percentage of the hope of future generations of mosquitoes could hardly fail in the course of years to produce a decided

effect on the prevalence of mosquitoes in the area dealt with. There may be some difficulty in insuring that the kerosene paid for by the authorities is actually applied to the use for which it is intended; but traces of the oil film are quite recognisable for many days after application, and by occasional European inspection of the work reported to have been done within the last week it ought to be possible to keep a check on the "fudging" of reports, much in the same way as is done in the case of vaccination, where the certainty of the inspection of a small proportion of cases at uncertain times and places has made what we call "false work" quite exceptional in the vaccine department. A single proved instance of "false work" ensures dismissal; and if a similar rule were made in the case of these proposed sanitary assistants, there would, I believe, be but little difficulty in ensuring that the work reported was actually done. Moreover, a single application of kerosene is so fatal to all air-breathing insect life that the presence of living larvæ after reported treatment would suffice to convict the sanitary subordinate of "bad work," and the discovery of larvæ before February 1 in this part of the world, in water said to have been treated at any time subsequently to November 15, would suffice to convict the assistant of either having "fudged" his work, or of having economised too much in kerosene—the amount required of which, as I have already shown, may easily be calculated.

The return furnished should state the name of the town or village, the compass bearing and distance of the pool in paces from the nearest house identified by the name of its occupier, the area of the pool, amount of kerosene applied, and the date of application; and it would be thus perfectly easy for anyone acquainted with the method of searching for larvæ to identify the pools said to have been treated, and test the quality of the work performed.

Moradabad.

After our various wanderings, we find ourselves once more in the Civil station of Moradabad, which is unfortunately no longer a military cantonment, for, with its sandy soil, and a paucity of suitable breeding places for mosquitoes, it is necessarily, for India, a very healthy locality. But considerations of health seem to weigh but little in the distribution of our troops, and the fine barracks have been abandoned, and are now utilised as school buildings for native lads, &c., while places notoriously less healthy retain their garrisons. Within the limits of the station there is only one considerable breeding place, which might easily be dealt with, but along its eastern boundary lies a tract of low-lying land, within the limits of which are numbers of backwaters of the Gangan river. Few of these are, however, near enough to the inhabited area to give rise to much danger, and those that are so might be filled in at no great expense by levelling the belt of broken ground which marks the boundary of the high ground.

Many acres of this are so cut up by nullahs as to be valueless as they stand; and as land near a large town is always valuable, it is probable that its reclamation would repay the cost, apart from its sanitary advantages.

Unluckily, some of these backwater pools lie quite close to the rather isolated large house, which has been utilised to furnish quarters for the young police officers, who, on arrival from England, are stationed here for about a year for training in their duties; and hence it is by no means surprising that several of these young gentlemen have contracted malarial infection within a few weeks of joining, at a time of the year (November) when they would be comparatively safe in a less mosquito-ridden spot. The house is a very fine one and otherwise well suited to the purpose, so that it is to be regretted that nothing has been done to improve the area in its immediate neighbourhood.

Up to the present I have met with no *Anopheles* in the house, but a few, mostly males, have been taken in our tents, which are still used for sleeping purposes; and one of the few females (*Nyssorhynchus fuliginosus*) was found on dissection to be infected, sporozoites being present in one of the lobes of the salivary glands. Hence, it appears probable that the rarity of infections at this time of the year is due to the scarceness of *Anophelinæ* in houses, and its frequency during the rains is due rather to the insects being driven out of the shelter they prefer into houses than to any actual absence of infected mosquitoes in the dry hot weather; so that it can hardly be said to be safe to sleep without a mosquito net even at this season of the year, though somewhat later the heat becomes so intense as to be too high for the development of the stage of the parasite that is passed within the mosquito.

ANTI-MALARIAL SANITATION IN INDIA.

Before concluding this series of letters it may be well to devote a little space to the consideration of what has been done in India in the matter of anti-malarial sanitation, and what might be done.

On the credit side of the ledger it must be confessed that up to the present there is very little to show. The operations at Mian Mir, which I have already described, appear to be about all that has been done by the direct initiative of Government, and these appear to have been completely dropped, as at the time of my visit nothing whatever was being done in the matter. Here and there, zealous medical officers have started mosquito brigades, &c., but it is obvious that unless backed up by the authorities, the funds at their disposal are too limited to enable them to effect much.

On the other hand, no attempt has, as far as I am aware, been made anywhere in India to utilise the system of the mechanical protection of dwellings, which over a very considerable portion of the peninsula is the only plan that can be expected to effect any good; for I am entirely sceptical as to the possibility of producing any marked effect on the numbers of mosquitoes in such localities as Assam, Burmah, and Lower Bengal, or in localities under canal irrigation. Alike in our civil and military hospitals, no attempt whatever is made to separate malaria patients from those suffering from other diseases, and as no attempt whatever is made to prevent mosquitoes from gaining access to the

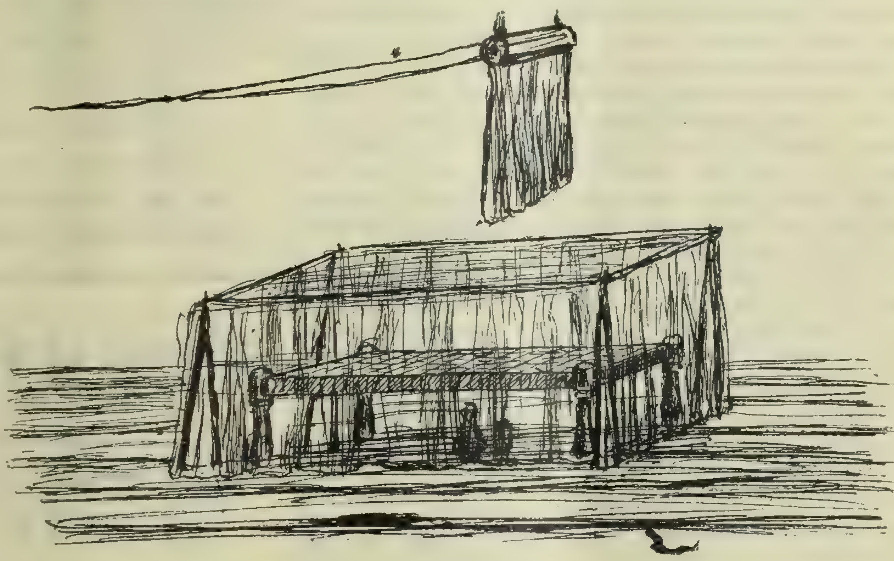
former, the infection of the latter becomes almost inevitable.

While in Italy it is illegal for the engineers of a railway under construction to leave undrained borrow pits along the sides of a line, in India, every operation of the Public Works Department, from the construction of a railway to the erection of a sentry box results in an addition to the malarial potentialities of the site in the shape of excavations made anywhere at the random will of the contractor, without so much as reference to the rudimentary considerations of neatness and sightliness.

As regards private individuals the active opposition and ridicule that met earlier attempts to convince the public of the possibility of preventing malaria, has to a great extent died down; but the acquiescence is at most academical and it appears almost hopeless to induce anyone to take the most rudimentary precautions. We are, indeed, much in the stage we were at one time as regards typhoid fever, when one was no longer laughed at for asserting that it might be avoided by proper attention to our supplies of water and food, but no one would be bothered to boil their drinking water, or pay any attention whatever to the source from which their milk was obtained. Such recklessness is now rare in anyone beyond the stage of griffinhood, and perhaps in time the Anglo-Indian public may be educated into taking precautions against malaria, but there are few signs of it as yet, and while they blaspheme at the humming torments that swarm round them, they maintain in their gardens convenient breeding places that would suffice to supply a decent sized town. And yet the small trouble of insisting on all water receptacles in their gardens being cleaned out once a week would secure comparative immunity for at any rate seven or eight months of the year in climates such as this.

In the daily paper before me is a wail from Agra, which is said at present to be suffering from a "veritable plague of mosquitoes," and yet this is naturally a singularly arid spot, and at this season the inhabitants have undoubtedly no one but themselves to thank if the mosquitoes be not extremely scarce; and the greatest sinners I have little doubt are the European community, whose extensive gardens are everywhere nurseries of the most ideal kind for mosquitoes of all sorts. One would hardly recommend a return to our abandoned policy of house to house visitation and forcible sanitation; but it may well be asked why it is so inexcusable of the native to neglect rational precautions against plague, while his enlightened (?) European ruler maintains within his immediate environment nurseries of a malady that annually carries off scores of victims for every one that succumbs to bubonic pest.

The use even of mosquito nets is by no means as general as might be expected, the reason being that it is difficult to combine the protection of a net with the comfort of a punkah, without which for several months of the year it is extremely difficult to sleep. Occasionally I have seen enormous nets arranged so as to admit of a punkah swinging within them, the net being suspended from the roof and the thong by which it is pulled passing through a sort of sleeve arranged in one side of a net. In places that enjoy the benefits of electric lighting, it is easy enough to fit a small fan, driven by current, within an ordinary mosquito net; but somehow the action of these fans is by no means as pleasant as that of the ordinary punkah, and they have an awkward knack of giving one a stiff neck, the current of air being too concentrated and continuous to afford the relief afforded by the rythmic puffs given by the old-fashioned hand-pulled appliance. Electric lighting is, moreover, still a most exceptional luxury, being confined to some of the largest towns, so that a description of the following arrangement, devised by a friend who is exceptionally sensitive to the attacks of mosquitoes, may be of use to those who desire to combine the protection of a net with an effective punkah.



Bed arranged with a low mosquito-net frame, with punkah above it.

It consists, as will be seen from the above sketch, of a roomy, but very low, mosquito net, just high enough in fact to be clear of the person of the sleeper as he lies on the bed. The top of the net is tightly stretched on to a quadrangular frame. A couple of feet longer and wider than the bed for which it is constructed, and is supported on a couple of light trestles, one at the foot and the other at the head of the bed, which takes no share in supporting the frame-work. The sides of the net are made just long enough to reach easily to the

ground, and the entire border is formed by a deep hem of calico, weighted with small shot, and is thus kept in close contact with the floor, so that the necessity of tucking in the net beneath the mattress is done away with, and its sides being kept well away from the bed it is impossible for the sleeper to get bitten by lying with his limbs in contact with the net.

The punkah is made to swing so as to come just short of touching the net, and if this is properly stretched is practically quite as effective as if no net intervened. During the day the top frame with the net can be lifted off the pair of trestles, and the whole arrangements put aside against a wall, where it takes up but little room. The only drawback is that it makes getting into and out of bed rather awkward, but this is far more than counterbalanced by the safety and comfort of the plan.

Sand might no doubt be used to weight the hem in place of small shot, and would greatly reduce the cost, but might be rather inconveniently bulky.

For sleeping in the open, which is much the healthiest and most comfortable plan during the hot dry weather, a net of the ordinary pattern must be used, as the breeze would generally lift the edges of a weighted net. It is essential, however, that the bed should be a large one so as to diminish the risk of lying in contact with the net, and the top should be formed of calico so as to keep off the dew.

One of the greatest obstacles to the adoption of anything of the nature of permanent improvements to dwellings is the migratory nature of most appointments. For reasons not very obvious to the victims our government appears to have a rooted objection to any officer being left long in any station, so that it is rather exceptional for a magistrate to be left long enough in a place to have learned to find his way about the streets of his headquarter town if it be a place of any size, and his colleagues, the doctor and policeman, rarely stay longer. The houses are usually rented from natives who can with the greatest difficulty be persuaded to keep their property weather proof, and though a house usually passes from a member of a department to his successor, a scarcity of officers so often leads to its being left empty for weeks or months, that it is practically impossible to organise any system of taking over tenants' fixtures. In the case of business men, however, whose number in up country stations is steadily increasing, there is no particular reason why they should not make their residences as healthy and comfortable as possible, and hence there is no reason whatever why they and other tolerably permanent residents should not adopt the system of completely protecting their houses by means of wire gauze. When it is remembered how thoroughly a house may be kept clear of flies with no better protection than screens of split bamboo, where the servants are properly organised by an efficient Anglo-Indian housewife, there cannot be the least doubt that with the far more efficient protection of properly arranged gauze screens there should be no difficulty whatever in excluding insects of all sorts.

(To be continued.)

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THE

Journal of Tropical Medicine

May 2, 1904.

THE ATTEMPT TO CHECK THE OPIUM HABIT IN FORMOSA.

Since taking over the island of Formosa from the Chinese in 1895, the Japanese authorities have, amongst other useful forms of practical hygiene, attempted to check the consumption of opium amongst the inhabitants of Formosa. The aborigines of Formosa are not known to be addicted to opium, for they are a savage race to whom neither the blessings nor the evils of civilisation have penetrated. Round the coasts of Formosa, except perhaps on the east coast, the Chinese have dwelt as traders and merchants for many centuries, and it is amongst the Chinese in Formosa that opium smoking is so prevalent. They acquired the habit from their brethren in China, where opium smoking has become a national custom. The Japanese method of dealing with the evil of opium smoking is practical

and eminently original. They pronounce every opium smoker as a sick man and proceed to treat him as a patient. There can be no doubt opium smoking was originally introduced into China as a means of arresting cough, especially the cough of tuberculosis, and as a means of subduing pain; but the habit has extended to the healthy, and the consumption of the drug is proving a serious hygienic problem.

This is no place to enter into the question of the introduction of opium into China from India. It is a subject which has passed into a vein of discussion which most men avoid. We should rejoice to see the traffic stopped, and the Chinese can, if they chose, kill the trade by a prohibitive tariff. They are, however, free to grow their own opium, as we are free to grow our own barley wherewith to produce whiskey. Were our drunkards to be dealt with as the Japanese deal with their opium smokers, and treated as sick folk, a great step would be taken towards curing drunkenness. Were all drunken men placed under the care of a doctor, nursed in bed by a hospital nurse, and detained for some days so that their physical state might be gone into, an excellent deterrent to drink would be initiated. A certain amount of ridicule would appertain to the procedure, and as we know, nothing kills custom so effectually.

The further steps taken by the Japanese for the arrest of the opium habit are: An official permit to obtain opium must be granted before anyone is allowed to possess the drug; young persons are prohibited obtaining opium under any pretence; the Government has made the production of opium a state monopoly. The appointment of district medical officers to control the medico-legal and sanitary affairs of their district, and to serve as "poor law" doctors, has done much to organise Formosa in a general sense. A medical school has been established at which natives are educated, and a number of students from Southern China have gone to Formosa for their education. The College of Medicine for Chinese in Hong Kong fails to attract men thither as it ought, owing to lack of Government support, and this short-sighted policy has resulted in Japan taking the initiative and ousting Britain from a position which was assuredly hers by the right of precedent and time-honoured prestige. The more general sanitation of Formosa proceeds under Japanese influence in a praiseworthy manner. The drug trade generally is placed under efficient control; midwives are legalised after being trained. Drainage, the disposal of sewage, and supply of pure drinking water are being dealt with. It may be truly said that the best traits of civilisation are being followed and given practical issue.

THE LONDON SCHOOL OF TROPICAL MEDICINE.

At the examination for the certificate of proficiency for the session ending April, 1904, the following students were declared successful:—

Dr. Norah Lenwood
Dr. A. L. Hoops (Colonial Service)
Dr. W. M. Eaton
Dr. J. B. Cleland
Dr. Olive McDougall
Dr. K. McGahey (Colonial Service)
} Passed with distinction.

Dr. J. Eldon.
Dr. J. E. M. Brown (Colonial Service).
Dr. M. E. Leicester.
Dr. A. E. E. Twynam (Colonial Service).
Dr. R. L. Roe ,, ,,
Dr. H. G. McKinney ,, ,,
Dr. G. F. Whyte ,, ,,
Dr. C. T. Costello ,, ,,
Dr. C. W. Somerville.

HORSE SICKNESS—CAPE OF GOOD HOPE.

Report of the Director of the Colonial Bacteriological Institute for the Year 1902.

Protective Inoculation for Horse Sickness—Salting Horses.

I am glad to say that the problem by which horses could be "salted" to the disease with little risk is now solved, and I propose to explain briefly the outcome of my work in this direction.

In previous reports I showed how methods had been devised by which considerable success had been attained, but there always remained the important drawback of uncertainty. Some animals "salted" easily, while others treated in exactly the same manner developed the disease in a virulent form and died.

That such a misfortune was due to peculiar inherent qualities in the animal inoculated was abundantly

shown in the results, and in none better than the following experiment.

I have formerly shown that while inoculation of donkeys with virulent horse-sickness blood does not kill them, and indeed seems in many cases to have little or no effect upon them, yet their blood, drawn at periods later than a week after inoculation, when used to inoculate horses, produced fever.

With the blood of such a donkey, drawn seven days after inoculation, three horses were inoculated, and with the blood drawn three days later one horse was inoculated.

These inoculations were made with 5 cc. injected subcutaneously.

The animal inoculated last nearly died, while of the former three one had a good febrile reaction; the others showed practically no reaction at all.

Later experiments made by injecting horses in the jugular vein with infected donkey's blood gave equal results. Hence one was able to conclude that *individual horses were more insusceptible to a weakened or attenuated virus than others.*

But it was also found, when the attenuated virus produced a sharp febrile reaction, that some protection was given, whereby such horses were able to resist death at a later date when inoculated with virulent blood. On the other hand, the animals whose relative susceptibility caused a resistance to the weakened virus, could not at a later date resist death when inoculated with virulent blood.

Hence it can easily be seen that the problem became a serious one, for, while a weakened virus would act on only a small percentage of the animals inoculated, leaving the rest totally unprotected, on the other hand, if one used a slightly stronger virus, there was the danger of a great and always uncertain mortality.

Thus a deadlock had been arrived at, and for some time it seemed to me that the barrier was well-nigh insurmountable.

The question now arose in my mind as to whether one could not devise some means whereby, in the first instance, some inoculation might be made which would by its action equalise the subsequent susceptibility for all horses.

While at the first glance such a thing would seem improbable, yet as a matter of fact it has now been achieved by the production of what I have seen fit to describe as the "malarial form of horse-sickness."

Malarial Form of Horse-Sickness.

When formerly working with the blood of infected donkeys I found, when the fever was produced, that it assumed an intermittent and remittent character simulating malarial fever in man; and on examining the blood of one such horse I found a very few parasites included within the red blood corpuscles. At that time I assumed that the parasites had been of the nature of an accidental infection, but I never felt satisfied with my own explanation. At a later date I began experiments in which I used "salted" horses instead of donkeys, and after having inoculated them with virulent blood, they were bled about the tenth day.

The blood was then used to inoculate clean horses by subcutaneous injection with 20 cc.

The experiments were spread over very many months. Different salted animals were used, and only one or two clean horses were inoculated at one time. The horses used consisted of twenty-one animals which were obtained from the Military authorities, and five which were obtained from farms in the Albany district.

Nearly all the animals developed fever, but those obtained locally showed it least of all. The military animals were, with one exception, probably all recently imported. The known exception had been running near Port Elizabeth for some time and, I understand, was born in the district.

During the febrile periods, well-defined malarial parasites were found within the red blood corpuscles. In many cases the infected corpuscles were exceedingly numerous, but in others, with less fever, they occurred in much smaller numbers.

I thought proper to denote this form of disease by the name of the malarial form of horse-sickness.

Subsequent to this it was suggested that my experiments had been accidentally contaminated with biliary fever which is known to occur in horses.

In answer to such a criticism I would remind you that no one has yet succeeded in transferring biliary fever from an infected horse to a healthy one in South Africa; in fact, those who have attempted to do so have failed. Under such circumstances it cannot but be surprising that I should succeed again and again in experiments extending over many months, if the condition which I produced had actually been biliary fever.

Biliary fever in the horse is not a disease limited to Africa; indeed it is well known in India. In 1888, Colonel Joshua Nunn, F.R.C.V.S., of the Army Veterinary Department, in the valuable report which he made after spending two years in South Africa, describes the pulmonary form of horse-sickness known as Dunpaardeziekte, the Dikkop form, and one which he and also Mr. Rutherford, A.V.D., describe as the "bilious form of horse-sickness."

It would therefore seem that Colonel Nunn found a disease here which was not, according to his ideas, biliary fever, *but was a variety of horse-sickness.*

I am of opinion that this excellent and careful observer was correct, and it is very probable, while true biliary fever exists in this country, that the condition which I have succeeded in producing artificially is neither more nor less than the form of horse-sickness described by Colonel Joshua Nunn as the "bilious form."

Since, however, the fever in this case is accompanied by the presence of malarial parasites in the blood, it is necessary to define it as the "malarial form."

With a view, however, to meeting criticism by better means than argument, I decided to undertake a critical experiment or series of experiments.

To this end the stables were carefully overhauled and rigorously disinfected. Thereafter ten clean, newly-imported horses were obtained from the Military authorities, and these, being sent to Grahamstown in trucks, were landed at the station and immediately stabled in the institute.

Inoculation was then carried out on one at a time, so that months elapsed before the experiments were completed. I have referred to details in the Appendix, and in brief may state that the results obtained fully and entirely confirm my previous conclusions that the fever produced is actually a definite form of horse-sickness.

Since, therefore, one can inoculate a donkey (a relatively insusceptible animal) with virulent blood, bleed it ten days later and produce a malarial fever by injecting the blood into a clean horse, it seemed fair to infer that animals in malarial regions, insusceptible to virulent horse-sickness, might nevertheless receive infection and transmit it through the agency of insects to susceptible animals in the malarial form. It will be seen that this has been established not only for donkeys and "salted" horses, but also for goats. The last experiment dealing with goats is exceedingly interesting. I bled a clean goat and injected the blood into a clean* horse. No fever followed, nor was any abnormality found in the blood. After some time had elapsed I inoculated the same clean goat with horse-sickness blood, and after an interval of time, I bled the animal and injected the blood into the same horse. Following upon this some fever was observed, and also parasites were seen in the blood.

The conclusions I seek to draw from this part of the investigation are :—

(1) That a malarial form of horse-sickness probably occurs naturally.

(2) The blood of horse-sickness when passed through animals which are either naturally insusceptible, such as the donkey, ox and goat, or through animals which have acquired protection, *e.g.*, "salted horses," conveys a modified infection of horse-sickness which is malarial in type, and is accompanied by the production of malarial parasites within the red corpuscles of the animal.

(3) The blood of "salted" horses which have been regularly re-inoculated for several months (10 cc. being used once a month), is dangerous when inoculated into clean horses if the blood has been drawn ten or twelve days after the last inoculation.

(4) If "salted" horses are allowed to rest for a few months and then re-inoculated with 10 cc. of virulent blood, their blood, if drawn ten or twelve days later, will set up a satisfactory degree of fever in other horses without much risk of death.

(5) The blood of "salted" horses *which have not been inoculated for several months* will also set up a reaction, but the result will be irregular and uncertain.

(6) Horses which have been running in the coast areas near Albany may resist the inoculation of the blood of "salted" horses, even when the latter blood is derived from animals recently re-inoculated.

(7) Blood taken from such animals as just specified, *i.e.*, "unsalted" horses, which resist inoculation with "salted" blood, does not give such an infection in clean horses as the blood of "salted" horses, even though the latter have not been reinoculated for a period of a year.

When the malarial form of horse-sickness has been produced, it is common to find that the temperature may rise to a great height. A temperature of 106° F. is fairly common, and it has even exceeded 107° F. The remarkable fact, however, has been fully established that the production of so high a fever may be attained with, practically speaking, no risk, provided that the infecting blood has been properly prepared. In the whole of the last series of experiments none of the animals have exhibited any symptom of illness, with one solitary exception. This one exception was a horse in which the temperature, which had been high, suddenly fell to normal. During one hour this animal seemed to suffer discomfort, but this phase having quickly passed over, it immediately regained its ordinary condition.

The Effect which the Malarial Form Produces.

Repeated inoculations of prepared blood from "salted" horses show :—

(1) That the blood of a "salted" animal possesses for at least a year subsequent to the last inoculation with virulent blood the power to induce fever in clean horses.

(2) That where fever has been properly induced in a clean horse the animal is protected against the same fever for at least a year.

(3) That if by reason of too small a dose of the blood, or owing to the blood being imperfect, only slight fever is induced, a second inoculation with proper "salted" blood will induce fever in a severe form. This form lies midway between the malarial and the virulent forms, and is attended with the risk of death.

(4) That one can prepare "salted" horses in such fashion that the blood can be safely used to induce the malarial form.

The Value of the Protection Given by the Malarial Form.

As I have formerly pointed out, the fever produced by the blood of properly-prepared "salted" horses often runs exceedingly high. A temperature of 106° F. is fairly common, while in some cases I have seen it exceed 107° F.

Viewing the manner in which this fever is set up, one would at the first glance imagine that a high degree of protection had been given. As a matter of fact, however, the protection given is very weak indeed, and if a fairly large dose of virulent blood (1 ccm.) be injected into the horse, the virulent disease will be certainly induced with almost certain death.

But in one case, a heavy English mare in good condition—the sort of animal which experience has shown us to be the least able to withstand the virulent disease, the injection of half a cubic centimetre of virulent blood was followed by only moderate fever terminating in recovery.

Again, while our experiments have abundantly shown the futility of using "salted" serum as a curative agent in the case of clean horses inoculated with virulent blood, I have found on a number of occasions where animals have been inoculated with "salted" blood and thereafter inoculated with virulent blood, that the fever thereby induced was unmistakably modified by several injections of serum.

On these grounds, therefore, I am convinced that "salted" blood gives a clean horse *some* protection, and I contend that this process applied to a number of animals renders their susceptibility to virulent blood much more regular.

THE STOOLS OF DYSENTERY AND THE PROGNOSTIC INDICATIONS DERIVABLE FROM THEM.

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Physician to Seamen's Hospital Society and to the Westminster General Dispensary; Joint Lecturer on Tropical Medicine at the London School of Tropical Medicine.

Much information can be gained from an inspection of the stools in dysentery, both with reference to the extent of the process going on in the intestinal canal, and also as regards the prognosis of the case. The dysenteric stool should always be seen by the physician at his visit to the patient, and the best method of preparing them for inspection is that practised at the General Hospital, Calcutta, instituted by Dr. Goodeve, a good account of which appeared in the *Edinburgh Medical Journal* for 1900, vol. vii., by Colonel Macleod, Professor of Tropical Medicine at the Army Medical School, to which the reader is referred. The article in question is well worth studying.

The following varieties of stools may occur in dysentery :—

(1) *The Stool of the Milder Forms.*—Here first of all a solid motion may be passed covered more or less with greyish or colourless mucus. This is succeeded by the passage of small quantities of offensive mucus, with minute fæcal lumps. Then there are passed mainly small quantities of mucus stained with fæcal matter, and often mixed with blood. And, withal, occasionally scybala are passed at intervals.

(2) *In a more Severe Form.*—After the bowel has discharged its contents, often solid, we find whitish or coloured jelly-like mucus, quickly becoming bloody, with often pretty large quantities of clotted blood. The motions are frequent and of about two or three drachms in quantity. This, *the mucous or muco-sanguineous stool*, forms a slightly yellowish, glaring, quivering mass lying in balls or clumps, without any fæces, or perchance around a formed mass of fæces. If the discharge be very fluid, the masses of mucus unfold into hyaline shreds.

(3) *The Sanguineo-Purulent Stool.*—Here in a small amount of yellow fluid, generally without fæces, float a number of reddish lumps as large as a pea or bean, in appearance resembling raw meat. Pieces of mucous membrane can at times be found in this variety of stool.

(4) *The purely Bloody Stool* results either from superficial or deep ulceration.

(5) *The Simple Purulent Stool.*—This results from the formation either of submucous abscesses, or from the mucous membrane being destroyed. The pus is either pure and odourless, or mixed with fæcal matter and blood.

(6) *The so-called Frog's Egg Stool*, consisting of clumps of tough mucus. Virchow holds this form may sometimes arise from the ingestion of starch food. Another view is that the mucus, which has been secreted late in the disease, is pressed into the cavities out of which the follicles have fallen, and then subsequently falls out again into the cavity of the bowel, retaining the shape into which it has been moulded in these follicular cavities.

(7) *The Pulpy Stool*, described by Sir Joseph Fayrer, is very offensive, occurring without blood or mucus.

(8) Sometimes we find, *with the ordinary stool of dysentery*, that from time to time the patient will pass throughout the course of the affection *fluid fæcal matter.*

(9) *The Gangrenous Stool.*—Here a blackish or blackish-red fluid is passed, with a horribly putrescent, penetrating odour, containing pieces of gangrenous tissue. Tubular structures may be found in the discharge, which by some are held to be separated portions of the intestinal wall. Heubner, however, holds that they consist only of mucus.

(10) *The Stools of Amœbic Dysentery.*—For some time I hesitated to think that such a disease as "amœbic" dysentery existed in India. For I had never seen any dysenteric disease in the Punjab or United Provinces—the parts of India I had served in—corresponding to the description of the form of the disease given by writers, and, moreover, I had found amœbæ in the stools of patients whose symptoms in nowise differed from those of the usual type of dysentery met with in my hospital. Captain Leonard Rogers, I.M.S., however, in a masterly paper read at the annual meeting of the British Medical Association at Manchester in 1902, effectually proved the existence of this variety of dysentery for Bengal. That at any rate it does not commonly occur in the Upper Provinces of India can be surmised from the large experience of Major Buchanan, I.M.S., who had not met with the cases described by Rogers, so that to designate "tropical dysentery" as synonymous in all cases with "amœbic" dysentery is not correct. "Amœbic" dysentery is but one form of dysentery met with in the Tropics, and moreover amœbæ are found in the stools of patients suffering from dysentery, the symptoms of which do not conform to those laid down as the classical ones of this variety of the disease. The stools of the amœbic dysentery described by Councilman and Lafleur, in their paper in the *Johns Hopkins Reports* for 1891, are mucoid, with purulent greyish shreddy material; greenish like spinach, or pultaceous, with occasionally large necrotic masses; dark brownish and liquid, floating in which are greyish-white masses of the size of a pinhead, embedded in blood and stained mucus. They are far more liquid than the ordinary stool of dysentery. The amœbæ are best found in the small greyish-white gelatinous masses.

(11) *The Stools of Chronic Dysentery.*—These vary much in character. They are thin, watery, of varying colour, and may be very offensive. Mucus, blood, and pus are mixed in different combination. Sometimes the blood is so intimately mixed that the whole stool is of a brownish or darkish colour.

We will now consider some of the indications obtainable from the different appearances of the stools in dysentery as regards *prognosis*.

(1) *A good result* can be foreshadowed in those cases in which are passed mucus with minute fæcal lumps, stained or not with blood, and in which the blood and mucus disappear; the ordinary fæcal characters will soon manifest themselves.

(2) *The prognosis* is of evil omen.—(*a*) According to Sir Joseph Fayrer, in the cases in which pulpy stools without blood or mucus are passed; (*b*) where fluid fæcal matter is from time to time passed throughout the illness; the prognosis is unfavourable, inasmuch as these characters of the stools show the disease to be extensive, and affecting chiefly the upper part of the large as well as in some cases part of the small intestine; (*c*) where the stools in conjunction with the symptoms that are laid down as characterising the true amœbic dysentery are present, the prognosis is again unfavourable, on account of the high mortality that is said to attend this form of the disease; (*d*) the prognosis is of the worst possible character where the stools consist of blackish-red or blackish fluid with a horribly putrescent odour, and of bits of gangrenous tissue. Personally, I have never seen a patient passing this character of motion recover.

Lastly, where the stools, together with the course of the disease, indicate that chronic dysentery is present, by most authors the prognosis is regarded as unfavourable. Dr. Stephen Ward, formerly Senior Physician to the Dreadnought Hospital, Greenwich, however, states that in these cases, provided they are properly treated, recovery takes place in the majority of cases.—*Edinburgh Medical Journal, April*, 1904.

THE COMPLETE HÆMOMETER.

The "complete hæmometer" case contains, besides Gower's hæmoglobinometer and Oliver's hæmacytometer, all the apparatus necessary for examining the blood according to the methods by Strong and Seligmann, Thoma and Durham. The objects in introducing such a case were two: Compactness and economy. The worker can now purchase the required apparatus complete in one case, at less than half the usual cost. Messrs. Charles Baker, of 244, High Holborn, London, W.C., have spared no trouble in making a most compact, useful and inexpensive case.

EDWARD HORDER, F.R.C.S.Edin.

Notes and News.

SALINES IN DYSENTERY.—The following prescription is recommended by Dabney:—

℞	Morphia	gr. ½ to i.
	Sod. sulph.	℥i.
	Aromatic sulphuric acid ..	ʒi. to iss.
	Cinnamon water	℥iv.

A tablespoonful in two ounces of cold water every three hours.

In dysentery occurring amongst the soldiers in South Africa, Mate found good results from:—

℞	Mag. sulph.	ʒi.
	Acid sulph. dil.	♏x.
	Quinine sulph.	gr. i.
	Tinct. opii.	♏x.
	Hydr. perchlor.	gr. $\frac{1}{32}$.
	Aq. menth.	ad. ℥ss.

To be given every three hours.

WE have received a letter from Messrs. Graham, Morton and Co., Ltd., of Leeds, drawing attention to their attempt to conform with the advice of H.R.H. The Prince of Wales to the "Old Country to wake up." All residents in the British colonies and dependencies will welcome the attempt to advance British trade. Nothing is a greater trial to the patriotism of British subjects abroad than the way the British merchants and agents allow trade in our colonies to slip from their grasp and to pass into the hands of commercial houses of foreign countries. The reason for this is so palpable that the loss of trade, and thereby of prestige, is all the more annoying. The refusal of British merchants to supply goods of the kind, colour and bulk wanted by the natives in the Tropics is proverbial, and so long as this foolish *régime* is persisted in it is little good "waking up" the home manufacturer if the goods are not "pushed," and if they are sent in a shape impossible for a native to convey into the interior. We hope British firms will give up this senseless position and cease their old time prejudices and customs, and try to remember that we are living in the twentieth and not in the eighteenth century. We hope the example set by Messrs. Graham, Morton and Co. will be followed, and that a halt will be called in the ruin of the trade of the Empire by men who are apparently unworthy successors of those who in earlier times raised this country to the foremost place.

IMPERMEABLE COATING FOR THE SURGEON'S HANDS DURING OPERATION.—Murphy, John B., recommends a 4 per cent. solution of rubber in a sterilised solution

of benzine or of acetone, instead of rubber gloves, to protect the hands during surgical operations. In preparing for surgical work Murphy first washes his hands for five to seven minutes with a 5 per cent. spirits of green soap in a stream of running hot-water; he then soaks them in alcohol for three minutes, and then applies the rubber solution. The hands so coated may be dipped in any antiseptic solution before commencing to operate, and when it is desired to remove the solution the hands have to be freely washed in benzine.—*Journ. American Med. Assoc.*, March 19th, 1904, p. 765.

STICKER states that palpation of the abdomen, whilst the patient lies in a hot bath, allows of a much more minute examination of the various organs than that offered by any other position or device.—*Zentralbl. f. Journ. Med.*, March 5th, 1903, p. 233.

BOTANY IN THE PHILIPPINES.—The Government of the Philippines have issued a "Dictionary of the Plant Names." Some 5,000 of the plant names used by the natives of the islands are enumerated. The flora has been compiled chiefly from previous publications by the Spaniards. The first work of the kind was Blanco's "Flora de Filipinas" in 1837, and practically re-issued by Vigil as a Dictionary in 1879. Some 2,400 names only are given in Vigil's list, so that the present work is much more complete than any previous publication.

THE CUDDAPAH HOSPITAL, MADRAS PRESIDENCY.—The annual report for 1903 of the London Mission Hospital at Cuddapah seems satisfactory from every point of view. The report very rightly contains a list of the operations performed by the medical staff, Dr. T. V. Campbell and Dr. E. W. Lewis. We should like also to see a list of all the ailments met with, so that a record of the diseases prevailing in the district might be obtained. There need be no comment on the diseases, only an enumeration. In this way only can the spread and prevalence of diseases in different parts of the world, their flow and ebb, and their endemicity be collated. The in-patients numbered 700, and the out-door attendances 14,246. Amongst the surgical operations we note sixteen cases of malignant disease showing that carcinoma, sarcoma and epithelioma prevail in this part of India. Two cases of hydatid were operated upon. A case of mycetoma (madura foot) and two cases of guinea-worm are mentioned. Cholera did not appear in the neighbourhood during 1903. Plague has never been seen in the Cuddapah area, although it is prevalent in adjacent districts.

Plague.

INDIA:—The deaths from plague in India during the weeks ending March 26th and April 2nd, numbered 39,975 and 46,320 respectively. Plague appeared in the city of Madras on March 19th, for the first time.

TRANSVAAL:—Up to April 23rd, 160 cases and 80 deaths from plague had occurred in and around Johannesburg. The precautions taken by the authorities combined with the approach of colder weather would appear to have checked the spread of the disease.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Distomum Ringeri (pulmonale).

MOUYE, Z. *Zeitschr. f. Klin. Med.*, vol. (band) l., parts (heft) 1 and 2.—Endemic hæmoptysis, due to the presence of the *Distomum ringeri*, or *D. pulmonale*, has been recognised as an ailment peculiar to Japan, Corea, and Formosa ever since 1878. The parasite has been regularly sought for in the Kumamolo Hospital, Japan, with the result that, out of 1,761 consecutive cases of respiratory diseases, no less than 103 cases (almost 6 per cent.) of distomiasis have been met with. In the hospital also of Okayama, during the seven years—1891 to 1897—of a total of 20,793 patients admitted to hospital, 87 had distomiasis. Men are stated to be attacked more frequently than females, and those engaged at agricultural labour suffer most; the early spring is the season of the year during which the majority of distomal lung affection appear. The signs and symptoms of the disease are: a chronic cough, expectoration of a rusty, or, at times, a yellow sputum, with occasionally bright frothy blood; the sputum has a peculiar odour, and varies in quantity from a mere trace to some ounces daily; Charcot-Leyden crystals appear in the sputum. The pulmonary signs are: bronchial catarrh, occasional localised patches of dulness; asthmatical attacks and pleurisy at times. The disease is sometimes complicated with tuberculosis. According to Mouye, nineteen cases of cerebral distomiasis have been recorded in Japan, with a variety of declared symptoms, such as unilateral convulsions, hemiplegia, vertigo, amblyopia, and aphasia. Local hyperidrosis, and even imbecility, have been noted. When the sputum is examined microscopically ova are constantly met with. The eggs are large (0·08 to 0·1 mm. in length, and 0·05 to 0·06 mm. in breadth), oval, smooth, and possess a thin, double-outlined, chitonous shell, possessing an operculum. The eggs when swallowed appear unchanged in the fæces; but if kept in water for a time the operculum opens and free-swimming embryos emerge. These are said to develop in an intermediate host, possibly the mussel, into cerrcaria, but the extra-corporeal life of the parasite has not been thoroughly made out. *Post-mortem* evidence shows the parasite and the ova to be resident in the lungs and in several other organs, notably, the brain, liver, omentum, intestinal wall, scrotum, orbits, eyelids, cervical glands, diaphragm, and even in Poupart's ligament. According to Yamagiwa, the parasites reach the various organs and tissues of the body by perforating the intestinal walls. Similar parasites are met with in the cat, dog, and tiger. No medicinal treatment is of any avail, but if the patient leaves the infected area the symptoms usually subside.

Malaria.

MORI, A. Profilassia Antimalarica. *Gazzeta degli Ospedali*, Milan, vol. xxv., No. 7.—Euchinin is preferred to quinine sulphate by Mori both as a prophylactic and as a remedial measure in malaria. He gives 25 to 50 centigrammes before food twice daily. Of seventy-four persons thus treated prophylactically, six only developed malarial fever, and of these two had left off taking the drug for a week. Euchinin has advantages, inasmuch as it has not the bitter taste of quinine, it is readily assimilated and does not give rise to quinism. Mori is of opinion that euchinin acts by having an agglutinating action on the erythrocytes.

Yellow Fever.

BANDI, I. *Zeitschrift für Hygiene*, 1904, No. 1, h. 81. —Bandi, from investigations pursued in Brazil, supports Sanarelli in his contention that an organism, the *Bacillus icteroides*, is present in the blood of the majority of yellow fever patients, and is the probable primary pathological factor in the disease. The arguments against the *B. icteroides* being the cause of yellow fever have been so often repeated that it is useless to repeat them in detail. They are chiefly: (1) The bacillus is claimed to be met with by Sanarelli in but ·58 per cent. of persons dead of yellow fever; (2) the lesions stated by Sanarelli to have occurred in animals when inoculated with the bacillus have not been confirmed by the majority of observers; (3) the agglutination tests also failed; (4) the experiments on human beings made by Sanarelli were not sufficiently controlled; (5) cultural results are variable and might relegate the organism to the hog-cholera or colon types of micro-organisms; (6) Sanarelli bacillus resists cold and even freezing for three days, thereby rendering it unlikely that the disease it is claimed to give rise to would be confined to warm climates. Bandi holds: (1) That the infrequent finding of the bacillus is due to the *B. icteroides* producing a powerful toxin whilst multiplying to even a small extent, and that yellow fever is a toxæmia; (2) that inoculation of hogs by intravenous injection produced the symptoms and pathological lesion significant of yellow fever, except that jaundice was not present; (3) that his experiments with infected *Stegomyia fasciata* mosquitoes proved negative; (4) that the *B. icteroides* can pass through a Berkefeld filter. Several of Bandi's results have been denied by other observers, such as Novy, Agramonte, and Havelberg.

One fact recorded by Bandi is worthy of mention, namely, that, contrary to Sanarelli, he found that the blood of yellow fever convalescents and immune animals does not agglutinate the *B. icteroides*. The argument for and against the *B. icteroides* being a factor in yellow fever would seem to have still many supporters of undoubted eminence; yet the organism has never been seriously received by pathologists. It may be, however, that the *B. icteroides* plays a part in the final stages of yellow fever, just as the micrococcus of Castellani may play a part in sleeping sickness although the primary pathological factor would appear undoubtedly to be a trypanosome.

Appointments, Change of Station, Leave, &c.

Medical men in practice abroad would find it convenient to send intimation of their movements to appear in this column: also their addresses when in Great Britain.

DR. P. H. BRYCE, Secretary to the Provincial Board of Health for the Province of Ontario, Canada, has been appointed Medical Inspector for the Departments of the Interior and of Indian Affairs.

Major J. WILL, R.A.M.C., has been appointed Principal Medical Officer of the East Africa and Uganda Protectorates.

Literary References.

TROPICAL DISEASES.

ANKYLOSTOMIASIS (UNCINARIASIS).

Austregesilo, A. Infestação da ankylostomiasis pela pelle, *Brazil-med.*, Rio de Janiero, 1904, vol. xvii., p. 447.

Battaglia, M. J. Anquilostoma duodenal, *Semana méd.*, Buenos Aires, 1903, vol. x., p. 869.

Bourget. Un cas d'ankylostomum duodenale, *Rev. méd. de la Suisse Rom.*, vol. xxiii., p. 523.

Breton. L'ankylostomasie en France, *Echo méd. du nord*, Lille, 1903, vol. vii., p. 448.

Bull. No 10. *of Marine Hosp. Serv.*, Hyg. Lab.

Combe. Un cas d'anémie pernicieuse par ankylostome duodénal, *Rev. méd. de la Suisse Rom.*, Genève, 1903, vol. xxiii., p. 269.

Court, J. The New Disease among Miners, *World's Work*, London, 1903, vol. ii., p. 611.

Craig, C. F. The Occurrence of Uncinariasis (ankylostomiasis) in Soldiers of the United States Army, *Am. Journ. Med. Science*, Phila. and New York, 1903, n. s., vol. cxxvi., p. 798.

Eichhorst. Anchylostomumanämie, *Cor.-Bl. f. schweiz. Aertze*, Basel, 1903, vol. xxxiii., p. 791.

Frattini, A. Dell' anchilostomiasis, *Salute pubb.*, Perugia, 1903, vol. xvi., p. 264.

Heimann, G. Das Auftreten der Wurmkrankheit im Oberbergamtsbezirke Dortmund, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1903, vol. xxix., p. 904.

Hendley, T. H. The Spread of Ankylostomiasis, *Brit. Med. Journ.*, London, 1903, vol. ii., p. 1393.

Iberer, J., jun. Die Ankylostomum-Frage, *Pest. med.-chir. Presse*, Budapest, 1903, vol. xxxix., pp. 1128, 1147, 1178.

Inoshita, K. A Case of Eye Disease connected with Anchylostomiasis, *Chiugai Iji Shinpo*, Tokio, 1903, p. 1160.

Julian, C. A. Hookworm Disease, *Carolina M. J.*, Charlotte, 1903, vol. xlix., p. 559.

Lambinet, J. La lutte contre l'ankylostomacie; le dispensaire du Mineur de Liége, *Scapel*, Liége, 1903-4, vol. lvi., pp. 166, 174.

Recherches sur l'influence de la température et de l'aération sur l'évolution des œufs et des larves de l'ankylostome duodénal, [Rap. de Kuborn], *Policlin.*, Brux., 1903, vol. xii., p. 442.

Langlois, J. P. L'ankylostomasie en France, *Presse méd.*, Paris, 1903, vol. ii., p. 822.

Nass, L. L'anémie des mineurs, *Corresp. méd.*, Paris, 1903, vol. ix., No. 220, p. 12.

Nieden. Ueber Augenstörungen bei Anchylostomiasis und bei ihrer Therapie, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1903, vol. xxix., Ver.-Beil., p. 353.

Plattner. Drei Fälle von Ankylostoma duodenale im Darm, *Wien. klin. Wchnschr.*, 1903, vol. xvi., p. 1261.

Smith, A. J. Uncinariasis in Texas, *Am. Journ. Med. Science*, Phila. and New York, 1903, n. s., vol. cxxvi., p. 768

Stiles, Ch. Wardell. Report upon the Prevalence and Geographic Distribution of Hookworm Disease (Uncinariasis or Anchylostomiasis) in the United States, 2nd ed. Washington, 1903 Govt. Print. Office, pp. 121, 8vo.

The Significance of the recently recognised American Hookworm Disease for the North Carolina Practitioner, *Charlotte [N. C.] Med. Journ.*, 1903, vol. xxiii., p. 149.

Tenholt. Die Ankylostomiasis-Frage; zusammenfassende Uebersicht, *Centralbl. f. Bakteriol.*, &c., 1 Abt., Jena, 1903, vol. xxxiv., pp. 1, 33.

Ueber die Bedeutung der Wurmkrankheit, der Anchylostomiasis, *Ztschr. f. Gewerbe-Hyg.*, &c., Wien., 1903, vol. x., p. 467.

Tinus, C. Die Bedeutung der Wurmkrankheit (Ankylostomiasis) im Bergbetriebe und deren Bekämpfung, *Ztschr. f. Gewerbe.Hyg.*, &c., Wien, 1903, vol. x., pp. 345, 369, 393, 417, 443.

Toth, I. Az anchylostomum duodenale Selmecbányán. [. . . in Schemnitz.] *Budapesti orv. ujsag*, 1903, vol. i., p. 467.

Warfield, L. M. Observations on Uncinariasis, *Amer. Med.*, Philadelphia, 1904, vol. vii., p. 60.

Zinn, W. Ueber die Wurmkrankheit Ankylostomiasis und ihre Bekämpfung, *Therap. d. Gegenw.*, Berlin, 1903, vol. xliv. p. 529.

MALARIAL FEVER.

Cardamatis, J. P. Rapports du paludisme avec la grossesse, l'accouchement et ses suites et vice-versa, *Grèce méd.*, Syra, 1903, vol. v., p. 65.

Carrasquilla L, J. de D. El paludismo y los anofelos, *Rev. méd. de Bogotá*, 1903-4, p. 35.

Delille, A. Les fièvres intermittentes symptomatiques, *Gaz. d. hôp.*, Paris, 1903, vol. lxxvi., pp. 1357, 1385.

Devaux, E. Une epidémie de malaria sans moustiques, *Rev. d. troupes colon.*, Paris, 1903, vol. ii., p. 87.

Quelques conseils pratiques au sujet de la bilieuse hémoglobinurique, *Rev. d. troupes colon.*, Paris, 1903, vol. ii., p. 394.

Jackschath, E. Zur Einführung in das Studium der parsitären Erkrankungen des Blutes, insbesondere der Malaria des Rindes und des Menschen, *Berl. tierärztl. Wchnschr.*, 1903, p. 769.

Le Dantec. Nouveau procédé pour la recherche des parasites du sang en général et des hématozoaires du paludisme en particulier, *Compt. rend. Soc. de biol.*, Paris, 1903, vol. lv., p. 1562.

McKibben, W. W. Malaria and Mosquitoes of Worcester; a Year's Observations on the Habits of Culex and Anopheles, *Boston Med. and Surg. Journ.*, 1903, vol. cxlix., pp. 665, 704.

Moscato, P. Sulla colica nefritica di origine palustre, *Rassegna internaz. d. med. mod.*, Catania, 1902-3, vol. iv., p. 261.

Plehn, A. Aetiologie und Pathogenese des Schwarzwasserfiebers, *Virchow's Arch. f. path. Anat.*, &c., Berlin, 1903, vol. clxxiv., p. 509.

Ueber die Verhütung und Behandlung des Schwarzwasserfiebers, *Virchow's Arch. f. path. Anat.*, &c., Berlin, 1903, vol. clxxiv., p. 541.

Ross, R. Der Antheil Koch's an der Malariaforschung, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1903, vol. xxix., p. 944.

Ruelens. Etiologie et pathogénie de la malaria, *Clinique*, Brux., 1903, vol. xvii., p. 953.

Schupfer, F. Sull'anasarca acuto nella malaria recente, *Policlin.*, Roma, 1903, vol. x., sez. med., pp. 502, 533.

Silvestrini, R. Mielite in corso d'infezione malarica, *Boll. d. Soc. Eustachiana*, Camerino, 1903, vol. i., Nos. 4-7, p. 24.

Steele, H. M. An Irregular Manifestation of Malaria in an Infant, *Yale Med. Journ.*, New Haven, 1903-4, vol. x., p. 250.

Watson, M. The Effect of Drainage and other Measures on the Malaria of Klang, Federated Malay States, JOURN. TROP. MED., London, 1903, vol. vi., pp. 349, 368, 1 pl.

Ziem, C. Sulla parte che prende il naso nella malaria e in consimili affezioni, *Arch. ital. di otol.*, &c., Torino, 1903-4, vol. xv., p. 64.

EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
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Original Communications.

TRYPANOSOMIASIS IN MAN.

By Guy R. Ruata, M.D.Turin.
Of the London School of Tropical Medicine.

The part the protozoa play in human pathology has been shown to be of increasing importance during the last few years, and recent observations on the mastigophora elucidate the fact that these are not merely occasional inhabitants of the body, but true parasites, infecting both man and animals. The action of these unicellular organisms has been abundantly demonstrated in the case of sleeping sickness.

Definition.

Trypanosomiasis is an infective disease due to a trypanosoma found in many vertebrates, giving rise in man, first to a remittent fever of a chronic type, to congested areas of the skin, local œdemas, a mild anæmia, increased frequency of pulse and respiration, sometimes enlargement of the spleen, general wasting and weakness; secondly, to a slowly-increasing lethargy of acute or chronic course, always terminating in death.

The Parasite.

Mastigophora are represented in the blood plasma by the *Trypanosomata.* These are found in reptiles, fish, birds, in various domestic and wild animals, and were first demonstrated in man by Nepveu, in Algeria, in 1890. Every time the parasite was detected in each different host a different name was given. I think with L. Rabinowitsch and W. Kempner[1] that a classification of the various species is not possible on a developmental and morphological basis; and that in differentiating between them we must take into account the biological differences, because it has only been possible through immunisation experiments by these observers to determine the different species of the parasite. "But, as the susceptibility of various animals of one species is different for the same kind of *Trypanosoma,* and subject to great fluctuations, it seems almost impossible to divide up the species of *Trypanosoma* by their relative pathology and virulence."

Classification.—The *Trypanosoma* belongs to the *protozoa;* class, *mastigophora;* sub-class, *flagellidia;* order, *Monadina;* family, *Rhizomastigidæ;* genus, *Trypanosoma.*

Calkins, in his book, "The Protozoa,"[2] gives the following characters:—

"Class, *Mastigophora,* are protozoa of definite or indefinite form, naked or provided with a well-defined membrane. The nutrition is holozoic, parasitic, holophitic or saprophytic. The motile organs are flagella, which may vary in number from one to many. Mouth, contractile, vacuole and nucleus are usually present. They are usually small forms with a widespread tendency to colony formation.

"Sub-class *Flagellida;* they are small organisms, possessing usually a sharply-defined mono-nucleated body with a definite anterior end, in which are inserted one or more flagella. They are actively motile during the greater period of life, but all have the power of encystment. Reproduction occurs by longitudinal division, usually during the flagellated stage, although it may take place during resting phases. Nutrition is holophitic, holozoic, parasitic or saprophytic."

Common to all *Trypanosomidæ* is a slender, spindle-shaped, granular, protoplasmatic body. The anterior extremity (Sambon, Guiart) may be rounded, pointed, or sharply or bluntly truncated; it contains a highly refractile spot, the *vacuole,* which represents the contractile vesicle.

Attached to nearly the entire edge of one side of the body is a sinuous fin-fold, named the *undulating membrane,* which projects beyond the body in form of a thin, thready, pointed, whip-like process called the *flagellum.* The movement of this protozoa is accomplished by the activity of this permanent vibratile appendage. This is a protoplasmatic filament, is derived solely from the ectoplasm, and it is constant in its position, and unchangeable. This protozoa, as is the case in almost all the mastigophora, swims with the flagellum in advance. Slightly posterior to the termination of the flagellum, near the vacuole, are some brilliantly-coloured patches of pigment; the so-called eye-spots or stigmata, or, more usually, the *centrosome* or *micronucleus.* These refringent specks are supposed by Pouchet (1886) to have some special relation to light, a probable view, based upon the fact that in many Mastigophora there is a distinct lens-like body (Calxius) and other structures which usually accompany eyes of primitive form in other types of invertebrates.

Engelmann's (1882) experiments, on the other hand, tend to show that it is not the coloured body, but the colourless protoplasmatic mass in front of the stigma which is particularly sensitive to light.[3] About the middle of the body is a rounded mass, much larger than the centrosome, but less defined; it is the *nucleus,* consisting of a single mass of chromatin, with an homogeneous structure, throughout all stages.

The multiplication is exclusively by fission, but nevertheless Rabinowitch and Kempner say that the longitudinal fission does not exclude transverse fission; they saw also a rapid formation of rosettes by multiple division.

The fission is invariably preceded by division of the centrosome, followed successively by the flagellum, nucleus and protoplasm. These fission forms are rarely found in the peripheral blood; occasionally, however, they are met with, and two flagella with no signs of fission in the centrosome or nucleus are met with. All the *Trypanosomidæ* are parasites of the blood plasma; are always free in the liquor sanguinis; never entering into the red corpuscles.

In searching the blood for *Trypanosoma,* the methylene blue stain, or, better still, thionine, on their fixed

[1] *Centralblatt für Bakteriology,* ed. xxxiv., No. 8.
[2] New York: Macmillan, 1901, p. 137.
[3] Calkins, *Op. cit.,* p. 37

films is a good method; but Leishman's modification of the Romanowsky method gives the best results. Staining the trypanosoma in this way the macronucleus, the micronucleus and the flagellum appear red, the protoplasm blue, while the undulant membrane remains almost unstained.

Nocard uses three solutions: Sol. A., chlor. hydrate of methylene blue, ½ gramme; carbolic acid, ½ per cent., 100 c.c. Sol. B., eosine extra BA. Max, 1 gramme; water, 4,000. Fix the film in absolute alcohol, take a drop of A., 12 drops of B., mix, allow to remain for half or one hour, wash in water. Stain for thirty seconds with C.: Tannin orange, Unna Grubler.

As very generally trypanosomes are scanty in the peripheral blood, judging from what occurred to many observers, Manson suggests it is probably best to make the blood examination when the body temperature is high, possibly centrifuging the blood, as the trypanosomes accumulate in the leucocyte layer above the red corpuscles.

We know up to date the following species of pathogenic trypanosomes:—

(1) *Trypanosoma Evansi* (Evans, 1880); measures 25·27 μ, by $1\frac{1}{2}$ to $2\frac{1}{2}$ μ, causes the "surra" in India; it is also met with in German East Africa, in the Philippines and in Mauritius.

(2) *Trypanosoma Elmastiani,* found by Elmastian in Paraguay, 1901; causes the "mal de caderas" in South America.

(3) *Trypanosoma Theileri* was found in Pretoria in cattle by Theiler, 1902.

(4) *Trypanosoma Brucei,* found in cases of "tsetse fly" disease, or Nagana, in Zululand, by Bruce in 1894; in South and West Africa; measures 26·28 μ.

(5) *Trypanosoma Rougeti* (Rouget, 1896) or *Equiperdum* (Döflein), is the parasite of "Dourine" or Mal du Coït, occurring in South Europe, North Africa, Chili; measures 25·28 μ.

(6) *Trypanosoma Lewisi,* 24·25 μ, abundant in rats, but not pathogenic; if injected in other animals it is removed from the blood by phagocytosis.

(7) *Trypanosoma Nepveui,* discovered in man by Nepveu, in Algeria, in 1890; Dutton and Forde were the first who drew attention to its relation with a specific fever attacking Europeans in the Tropics. Was called *Trypanosoma gambiense* by Dutton, but to this there are objections as the parasite may not be confined to Gambia. Manson called it *Trypanosoma hominis.* It measures 24·3 μ in length.

(8) *Trypanosoma Castellani,* found in Uganda by Castellani (1902) in the blood and in the cerebrospinal fluid obtained from cases of African lethargy by lumbar puncture during life. This *Trypanosoma* is the cause of the African lethargy, as was confirmed by Bruce and by Manson. It measures 18·26 μ, by 2 to 2·5 μ.

Geographical Distribution.

The conjecture that the human parasite might be specifically distinct from those infecting lower animals seems to be a fact. So we can say that the human Trypanosomiasis is at present peculiar to Africa, where it existed at least from the beginning of last century. The geographical distribution of trypanosomiasis was at one time confined to that part of West Africa which lies between the mouth of the Senegal to the North, and Bengulla province to the South, including also the islands of the Gulf of Guinea (Princes Island, Saint Thomas, Fernando Po). Roughly speaking, a latitude of 15′ North and 15′ South. But from this singularly primitive, limited geographical distribution in that part of West Africa, Trypanosomiasis, possibly in consequence of the great commercial stir created by the advent of the white man amongst the native tribes, has begun to spread very widely, extending to districts hitherto immune, as missionaries and other observers concur in asserting. In a few years it has spread a thousand miles up the Congo, reaching Bangola, Stanley Falls and, proceeding along the new track routes which are being rapidly opened out by Europeans, it has appeared in East Central Africa, invading the shores of the Victoria Nyanza lake. Now it extends from the mouth of the Katonga River, through Uganda (1901, Cook), Kome island, Busaga, Buvuma, Kavirondo, Kisumu, Lumbwa, Homa, Kasagunga, Lusinga island, the eastern shores of the lake, joining the south of the boundary river Gori in the Udemi district of the Sultanate of Obo.

Dr. Cuthbert Christy, who travelled nine months in that country, states the infection does not occur on the Upper Nile or its tributaries, nor on the Naudi Plateau.

The extension on the Congo (1901), as in Yebba on the Upper Niger (1898), is believed to have been brought about by the revolution in travel, and the opportunities of communication entailed by the substitution of steamers for canoes. But, although widely diffused throughout this huge region, the infection occurs as epidemic only here and there in certain circumscribed spots, in certain villages or group of villages. "Nor," as Manson pointed out, "is it always equally prevalent in these places where it seems to come and go, to wax and wane."

Epidemiology.

As we know that in the study of all infective diseases, a complete knowledge of the conditions of the locality and the way in which the infection occurs, can give us the key to the exact etiology, when speaking of parasitic infection, we must now consider the characteristics of the infected localities, together with the conditions under which the infected people are living, and see if they are connected with the life of animals and plants in the area.

Dr. Christy wrote[1]: "The disease is most prevalent amongst the inhabitants of low-lying shambas (banana and potato plantations), in places along the shores of the Victoria Nyanza, or in wooded districts not far from the water. But even in these districts natives who lived in villages, particularly if they were situated on high ground, were much less affected than those living in the shambas, and those living in large compact villages, encircled by the usual high cane structures, were less seriously affected than the occupants

[1] Reports of the Sleeping Sickness Commission, Royal Society, No. 3.

of scattered villages, in which the huts were surrounded by bananas of forest growth. People inhabiting populous centres, as Kampala and Entebbe, were practically exempt, while those living on open grass plains were quite free from the disease."

(1) *Influence of Sex.*—The disease attacks both sexes in equal proportion.

(2) *Influence of Age.*—Age has no influence upon the infection. Christy saw many children affected, some eighteen months or two years old.

(3) *Occupation.*—The influence of this cause is very important. The large majority of cases occurs amongst agriculturists and residents in the shambas. Bruce adds: "It is on the densely-wooded shores of the lake that the half-naked natives of the mainland and islands meet in thousands to trade in fish, bananas, earthenware, &c."

(4) *Influence of Seasons.*—It seems uncertain if there is any connection between the infection and the wet and dry seasons. "The wretched victims, as Christy notes, whose sensibility to cold is much increased, are perhaps more in evidence during the hot, dry weather, for they are then induced to crawl out of their huts and lie in the sun."

(5) *Food.*—The staple article of diet is banana, dura, milk, butter, any kind of meat or fish; fish—*Talapia galilœa*—is dried; the smaller in the sun, the larger is cleaned and smoked over a wood fire.

(6) *Influence of Drinking Water.*—Many of the inhabitants of the infected area get their supply from the lake Victoria Nyanza; many natives draw water from streams, ponds and springs.

The fact that the infection prevails equally would seem to indicate that the water supply has no relation to the spread of the disease.

(*To be continued.*)

COLD WEATHER NOTES ON MOSQUITOES FROM THE UNITED PROVINCES, INDIA.

By Lieut.-Col. G. M. Giles, M.B., F.R.C.S., I.M.S. (Retired).

(*Continued from p.* 138.)

Wire Gauze Protection for Dwellings.

What an addition to the comfort of life this would be, putting aside all consideration of malaria, can be readily realised by anyone who has had to struggle to keep his plate and glass clear from the cloud of mingled moths, gnats, flying ants and entomological curiosities of all sorts that are attracted by the lights of an Indian dinner table during the rains, to say nothing of the frogs and toads that invade the rooms in enormous numbers, besides occasional intruders of a more formidable character, such as snakes, scorpions, centipedes, wasps and hornets.

It is easy to say that Indian servants would leave the doors open, but if properly fitted it becomes very troublesome to do so, and as a matter of fact by a little insistence they are easily trained to carry out any reasonable plan. The easiest plan of settling the question, it may also be pointed out, is to try the experiment instead of discussing its possibilities.

The ordinary Indian bungalow does not, it may be admitted, lend itself very readily to the adoption of the plan, on account of the enormous number of doors, which take the place of windows in a European house. Most of these are quite needless for purposes of traffic and can be permanently closed without any inconvenience, as may readily be imagined from the fact that a large room I once occupied had no less than thirteen doors to it, while three or four is no uncommon allowance.

The principle to be kept in view in adapting the system of wire gauze protection to any building is to reduce the number of doors available for traffic to the absolute minimum consistent with convenience, and to permanently close all other openings with wire gauze; while the openings left available for traffic are protected by double doors made so as to close themselves automatically with a spring, so that the outer door must necessarily be closed before the inner one can be opened. It is further essential that at least one verandah of considerable area should be inclosed within the girdle of protection, so as to afford a safe place of rest at times when it is more comfortable to pass one's time in the open air.

To illustrate what is means the ground plan of an existing up-country bungalow is given on next page, wherein the position of the necessary wire gauze screens is shown by dotted lines.

As will be seen by an inspection of the plan there are no less than twenty doors opening on the exterior and ten windows (shown as obliquely shaded interruptions of the outline). Besides these there are fourteen small windows close up to the roof for ventilation which cannot be shown. Of the twenty doors four are small ones belonging to the bath rooms and which, as they are only used by the servants who attend to these, are only used a few times in the day. Single gauze inner doors only are therefore required for these.

The whole of the front or northern verandah is completely enclosed with wire gauze stretched on a light wooden frame-work, and is provided with a single pair of spring doors for convenience of access to the garden. As the seven doors of the three front rooms open on to this verandah no protection is required for them. Of the remaining eight doors, one, opening into the dining-room, is provided with double spring doors for the convenience of the servants on their way to and from the kitchen, which is, as usual, in a separate building. The remaining seven doors, being in no way required for traffic, are permanently closed with screens of gauze, as also are all the windows. The main entrance into the hall is also provided with an inner and outer pair of spring doors.

The total cost of this instalment may be estimated as about Rs. 375, or £26, estimated on the current cost of materials and labour in a place such as this. The expenses being made up as follows:—

	R.	a.	p.
7 gauze frames for permanently closing needless doors about	85	0	0
3 pairs of double spring doors at Rs. 45..	135	0	0
4 single spring doors for bath rooms at Rs. 12/8	50	0	0
Covering 14 dormer windows with gauze at R. 1	14	0	0
Gauze frames for 10 small windows at R. 1/4 ..	12	8	0

Enclosing Verandah.	R.	a.	p.
56 running feet mango planking 10 in. × 1½ in.	8	0	0
368 running feet salwood battens 1½ in. × 2 in.	15	0	0
75 yards of wire gauze 2 ft. wide, 12 strands to the inch, at R. 0/12 per yard	56	4	0
Contingencies	14	4	0
	Rs. 390	0	0
Equivalent to	£26	0	0

The prices given for the wire gauze and timber are those at which the articles are obtainable in the local bazaar without any bargaining. And the prices of doors, frames, &c., are those at which a native carpenter offered to do the various jobs. Curiously enough the wire gauze is obtainable in this remote station at half the price quoted by a large Calcutta firm, and in Italy is imported from America at a considerably lower price, so that no doubt by judicious buying the cost might be considerably reduced. The cost of fitting up a single bedroom, such as those shown in the figure, with three permanent frames for needless doors and a single pair of spring doors to that communicating with the large living rooms would be but Rs. 75, or £5, not, it must be admitted, a very large sum to pay for so great a help to health and comfort. This includes gauze for the windows of the attached dressing and bath rooms, but assumes that the door of the latter will be kept closed when not in use.

Moreover, as the size of doors is pretty generally 7 ft. by 4 ft. 6 in. it might be possible to so construct the fittings that they might be taken down and transported with other furniture when transferred to another station.

I have gone into considerable detail on this question as very exaggerated ideas appear to be prevalent as to what would be the cost of installing the system.

For excluding flies, wire gauze doors have already been largely adopted, especially in our railway refreshment and waiting rooms, and I understand from their engineers that the gauze, in spite of its apparent fragility, lasts well and does not require as frequent renewal as might be expected.

It must be clearly understood that to properly apply this system the doors must *always* be kept closed, and that the usual Indian plan of opening everything in the early morning must above all things be carefully avoided, as it is at this particular time that mosquitoes make their way into any shelter that may be available. The practice of rolling up the curtains of split bamboo, that are commonly used to guard the doors, is no doubt based on the habits of flies; which insects take shelter during the night and fly out into the open in early morning.

Any insects that may be present in the house when the screens are installed may easily be driven out by burning a little incense, or making a smoke of any other description, and opening all doors at sunset, at which hour, if not prevented by obstructions, they will naturally make their way out into the open, but the doors should be all re-closed before any lamps are lit within the house, and once freed of insects the gauze doors should be kept continuously closed, though during the heat of the day the necessity of doing so is mainly on account of flies than of mosquitoes, as the latter have all taken shelter for the day by the time the sun is well up.

As, however, all doors available for traffic are double, and made to close automatically, they can only be left open by deliberately taking the trouble to fix both of them open, so that it is impossible for any servant to excuse himself for doing so on the score of forgetfulness.

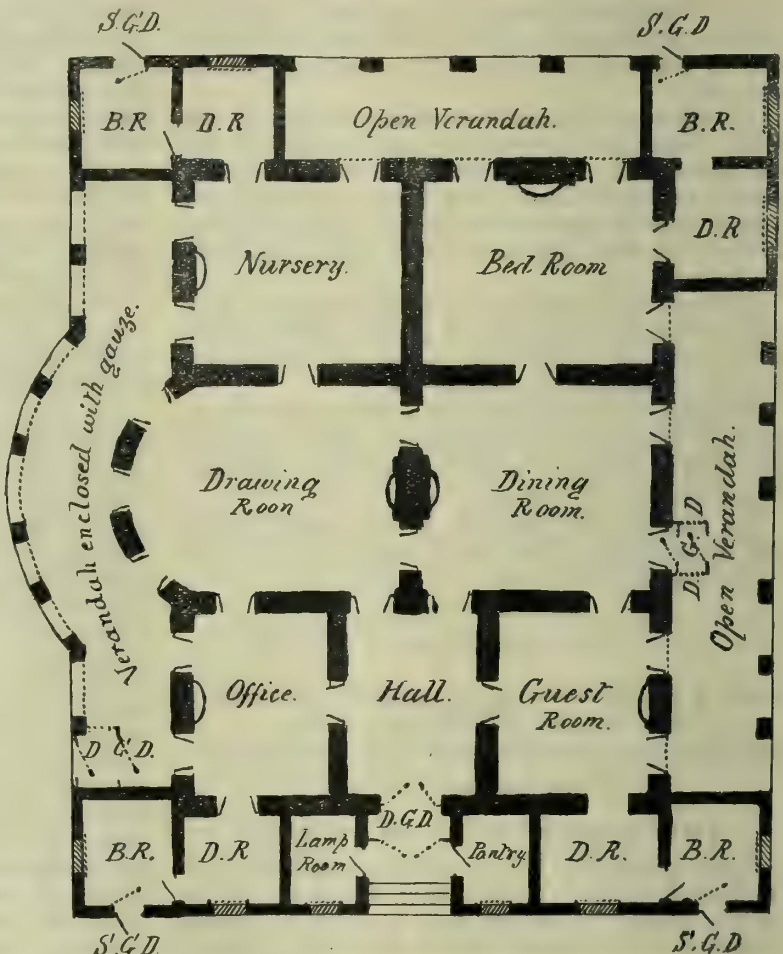

Fig. 2.—Ground plan of an existing up-country Indian Bungalow, to show method of adapting one (Professor Celli's plan) of wire gauze protection. The dotted lines represent the wire gauze screens. *D.G.D.*, double spring doors of wire gauze; *S.G.D.*, single spring door of wire gauze combined with existing ordinary door; *B.R.*, bath-room; *D.R.*, dressing-room. Scale, 18′ = 1″.

Whatever may or may not be practicable in India in the field of general anti-malarial sanitation, there can be no doubt of the applicability of the above system to individual prophylaxis, and also to the protection of bodies of men under discipline. That this is the case is shown beyond all question by the success of the system in the case of the employés on the railways in the Italian Campagna.

Enormously as Italy has advanced of late years there can be no doubt that the working classes in that country are still a good deal behind their compeers in England in education. Added to this, the Italian railway man is very commonly a Socialist and rather inclined to go "agin the government" on principle; so that the human material Professor Celli had to work upon was of anything but a plastic character. In spite of this the healthiness of the inhabitants of the protected cottages was so obvious an object lesson that by the end of the year the occupants of those left unprotected for comparison were only too eager to be protected in the same way. During the first two years, in twenty-five protected cottages, with a population of 173 persons, only 8 were attacked with fever, whereas in 30 unprotected, having a population of 220, only 17 escaped the disease.

Last year, while in Rome, I visited the scene of these operations in company with Prof. Celli, and I understand from him that as the people begin to better understand and appreciate the system, the results are becoming even better. I also saw one of the temporary Campagna villages. Mere grass huts, not a whit in advance of those of our Indian *Banjuras*, and was shown how it had been possible to protect them in the same way, and thereby to render it possible for the usually migratory tenants to remain at work with impunity during the malarious season. Besides which I visited a picturesque mediæval castle, which had been converted into a farm house, and protected in the same way. In the vaulted ground floor of this old stronghold were some 200 fine milch cattle protected in the same way. These cattle cannot be let graze in the open on account of cattle malaria, and their stalls appeared to be too dark according to English ideas. But it must be confessed that they were in splendid condition, and it must be remembered that the possibility of human beings being able to carry on farming operations throughout the year, so as to provide food for this large and valuable herd was entirely due to the thorough adoption of Professor Celli's plans. This is rather a digression from India, but it is well to make it clear that what is so strongly recommended has got beyond the stage of a "theoretical fact," and is now an accomplished fact and, it may be added, a commercial success.

The above estimate of the cost of protecting a house, it may be added, is probably a high one, as there is little doubt that the expenses could be considerably reduced by judicious bargaining, and by obtaining the gauze either from Europe or America.

Personal Protection.

Probably the period of the day at which one is most exposed to danger is the time spent sitting in the open before and after dinner, as the mosquitoes, having but recently issued from their resting places for the day, are especially voracious at that time; and are especially prone to attack the ankles, where they are secure from observation. Even a fairly thick sock is but a poor protection, and the lace work stockings affected by ladies none whatever. In the case of men the flannel trousers usually worn turned up at tennis and other similar games commonly played at that time of the day should be carefully turned down, and it is well to have them cut full long, so that they may thoroughly protect the vulnerable points. In evening dress the same end can be obtained by reverting to the old fashion of wearing straps. It is difficult, however, for a lady to protect herself except by adopting the practice of throwing a gauze shawl over the feet when resting, and it is needless to remark that their full evening dress is neither more nor less than an invitation to attack, and should be replaced by a blouse or some gauzy material puffed in such a manner at to prevent mosquitoes alighting on it from getting within striking distance.

Worst off of all, however, are the children, and it cannot be too strongly pointed out that in spite of its according with current fashion and the coolness and comfort of the dress, the practice of allowing them to go about bare-legged in the evening is neither more nor less than wilfully exposing them to a very real and serious danger.

Surely it ought to be possible for their mothers to devise some costume that combines coolness with protection, and let us hope that their affection for their progeny may nerve them to do so, even at the cost of making them according to the laws of current fashion "frights."

Little boys used to look very well in absolutely correct man-o'-war costume with long trousers, so at worst they would but incur the odium of being old-fashioned, but for the little girls a mere man can hardly propose to legislate, beyond pointing out that it is absolutely culpable to let them go about in the evening dressed as they now are.

In bringing this series of articles to a close it cannot but be confessed that the condition of things pictured is anything but satisfactory or creditable to the Indian Government, who seem less able or willing to move in this important matter in our long-settled Eastern possessions than the Americans in Cuba after a few months possession.

The policy in fact of the Indian Government in the matter may be said to be one of masterly inactivity, tempered by just sufficient show of action to afford a convenient reply to awkward questions in Parliament.

It is difficult to account for this save under the assumption that our bureaucracy regards the consequences of Major Ross's discoveries in the light of an unmitigated nuisance, which can hardly fail sooner or later to divert some share of the public funds from the more congenial projects of strategic railways, and the promotion of litigation amongst the native population, by the establishment of extra judgeships.

Meanwhile the sanitary bugbear is to be kept off as long as possible by the production of voluminous

files of correspondence, which can always be quoted as evidence of the earnestness of the authorities in the matter, and which cost but little as long as no practical steps whatever are taken. But meanwhile, too, the drain on our forces, alike military and civil, goes on continuously, and the cost in the item of ineffective pay of those temporarily disabled or prematurely pensioned on account of the results of malarial disease must be enormous, while thousands of the soldiers, who are so difficult to enlist and so costly to train, are invalided yearly from the direct or indirect effects of this disease.

Let us hope that our next Viceroy may exhibit as strong a *penchant* for sanitary reform as Lord Curzon has shown for frontier policy, and as preliminary steps, the good effects of which may be guaranteed to be immediately apparent, let me commend to his consideration the abolition of canal irrigation in all cantonments and civil stations, and the protection of all barracks and hospitals against the entry of mosquitoes, by the adoption of properly contrived wire gauze protection.

TRYPANOSOMIASIS.

Adams, A. M. Trypanosomiasis and Morbus Dormitiva, *British Medical Journal*, 1904, April 16th.—Dr. A. Maxwell Adams points out that in a paper written December, 1902, and published in the *British Medical Journal*, 1903, March 28th, he drew attention to the relation between trypanosome infection and sleeping sickness in a paper entitled: "Has the Trypanosome any relation to Sleeping Sickness?" It is plain from this announcement that Adams anticipated the discovery made in 1903 by Castellani as to the presence of trypanosomes in the cerebro-spinal fluid in cases of sleeping sickness. The discovery by Colonel Bruce of the part played by the tsetse fly in horse sickness and sleeping sickness is, no doubt, true as far as Uganda is concerned, but in the Gambia (except in Kombo) horses are healthy and the tsetse fly absent. Rat bite was considered by Adams at one time as the probable mode of infection for human beings, but he is inclined to doubt this idea now, and is rather inclined to attribute infection to a fly found in the mangrove swamps of the African river similar to the common horse fly in India, which is supposed to cause the infection of horses with trypanosomes. The ornithodorus moubata, at one time suspected of being the infecting agent, does not exist in the Gambia. Adams considers, however, that this animal may in other parts be a carrier of the infection, just as the parasite of Texas cattle fever is carried by a tick, and as the halteridium of birds, which has been shown to be one stage of a trypanosome, finds full sexual life in the Culex pipiens. It is easily conceivable, therefore, that several species of blood-making insects play a part in the morphology of this parasite. There is no doubt that Adams was the first to seriously entertain the idea that sleeping sickness was caused by a trypanosome, and that the disease was identical in the European and the African.

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THE

Journal of Tropical Medicine

May 16, 1904.

MR. CHAMBERLAIN AND TROPICAL MEDICINE.

The Royal Institute of Public Health has arranged to entertain the Right Honble. Joseph Chamberlain, M.P., in recognition of his eminent services to Preventive and Tropical Medicine during the period he occupied the position of Colonial Secretary, at the Criterion Restaurant, on Thursday, June 30th, at 7.30 p.m. Tickets £1 1s. (inclusive) may be obtained from James Cantlie, M.B., Honorary Secretary to the Institute, 19, Bloomsbury Square, London, W.C.

ANTI-MOSQUITO WORK IN AMERICA.

Our knowledge of malaria prophylaxis grows as years advance, and many modes of gaining the desired end are advocated. Each and every method of prevention finds many ardent supporters, and on the other hand, detractors of one and all are plentiful. The mosquito-malaria theory finds opponents only amongst the ignorant, and the belief that malaria is a product of the soil has been conclusively refuted.

The introduction of malaria by infected persons into regions where the disease was previously unknown has again and again occurred within recent times. The appearance of the disease in Mauritius in 1866 is a noted and historical instance of the kind, and more recently a similar experience has been brought to light in the island of Turi (Italy). Up to 1901 malaria was unknown in the island, but in June of that year a man returned to his home in Turi suffering from malaria. Within two months 195 persons out of a total population of 534 were infected by malaria, of which five died. The communicability of malarial fever has been frequently recorded, and the recent example of Turi adds yet another instance of its virulence.

There can be no doubt that malaria prophylaxis can be efficiently carried out on islands and in isolated districts. Although the experiments of Rivas in the island of Brioni were only partially successful, the absence of complete success must be attributed to the want of thoroughness in detail. On the other hand, Ross's work in Ismailia, an isolated district of infection, may be said to be a complete demonstration of the possibility of eradicating malaria by the destruction of the breeding places of the mosquito. The attempt to destroy mosquitoes breeding over a wider field has many difficulties, and the applicability of this method of eliminating malaria in towns and districts on a continent is by some thought hopeless. Many think that the "mosquito-brigade" plan of dealing with malaria, introduced in several towns on the west coast of Africa, is but waste of time and money, whilst others maintain its efficacy. The latter may take heart in their work by the example set them in America.

On the banks of the Rio Grande River stands the city of Laredo. The part of the town on the left bank of the river is in Texas, U.S., and that on the right bank, termed New Laredo, is in Mexico. The river is spanned by bridges and ferry boats, and innumerable skiffs ply between the two parts of the city. In September, 1903, yellow fever was reported to be prevalent in the city and medical officers of the United States Government were deputed to deal with the outbreak. In spite of the free communication between the two parts of the city by way of the river, the medical officers set to work upon an anti-mosquito campaign in the part of the city situated in Texas. Yellow fever patients were screened, water tanks and other possible mosquito breeding places were oiled, and infected premises were disinfected, so as to kill mosquitoes. The result of the experiment was amply proved by contrasting the extent of the outbreak in the Texas portion of the city, where the anti-mosquito campaign was carried out with thoroughness, with that which prevailed in the Mexican portion of the city, where the anti-mosquito work was dilatory. In the Texas part of Laredo yellow fever attacked but 10 per cent. of the inhabitants, whilst in New Laredo, Mexico, 50 per cent. suffered from the disease. So thoroughly was the work done that by November no Stegomyiæ in the adult, larval, or pupal stage could be found by the officer sent by the Public Health and Marine-Hospital Service to inspect and report upon the state of the city. The United States Government officials, however, are not confining their attention to one city. All along the border between Texas and Mexico, wherever danger of infection exists, mosquito destruction has been carried on during the winter, and the United States Government have succeeded in obtaining the co-operation of the Mexican Government in their prophylactic endeavours. As with Stegomyiæ so with Anopheles; and the example set us by the Americans should teach us to continue the work of extensive anti-mosquito campaigns, be the area to be dealt with a city in the African jungle or adjacent to a mangrove swamp.

TINEA IMBRICATA IN BRAZIL.

By Dr. Ulysses Paranhos.

This communication was addressed as a letter to Sir Patrick Manson.

Hitherto it has been believed that this peculiar epiphytic skin disease was confined to the Eastern Hemisphere, but the following extract from a letter recently received from Dr. Ulysses Paranhos, of the Pasteur Institute, San Paulo, Brazil, shows that it occurs also in certain tropical parts of South America.

"In my country *Tinea imbricata* exists in the States of Goyaz, Minas, Matto-Groso, and San Paulo. In the State of Goyaz it has been observed among the

aborigines on the banks of the River Araguay, in the State of Minas in the town of Uberaba, and in Matto-Groso on the left bank of the river Araguaza. In the State of San Paulo from where I write and in which I have studied and observed several patients, *T. imbricata* occurs on the banks of the River Rio Pardo, and in the towns and villages of Jardinopolis, Larandy, Visconde, Coronel, Orlando, and at Batataes—a populous centre with several thousand inhabitants. This year there has been presented to the Faculty of Medicine of Rio de Janeiro, by Dr. Paes-Leme, a thesis on *T. imbricata*, containing a complete account of this dermatosis in Brazil, and indicating with precision the geographical distribution of the disease in this country."

TROPICAL ULCER.

Tropical Ulcer (Delhi sore). Wright, J. H. Protozoa in a case of tropical ulcer, the *Journal of Medical Research*, vol. x., No. 3, 1903, December. After referring to the investigation on the subject of tropical ulcer, frequently referred to as Delhi boil, Aleppo boil, &c., by D. D. Cunningham ("On the Presence of Peculiar Parasitic Organisms in the Tissue of a Specimen of Delhi Boil." *Scientific Memoirs by Medical Officers of the Army of India*, Part I., 1884, Calcutta, 1885); by Gustav Riehl (*Zur Anatomie und Ætiologie der Orientbeule, Vierteljährsschrift für Dermatologie und Syphilis*, 1886, p. 805); and by R. H. Firth ("Notes on the Appearance of Certain Sporozoon Bodies in the Protoplasm of an 'Oriental Sore,'" *British Medical Journal*, 1891, January 10), Wright gives a description of his investigation in this disease. The lesion consists of single or multiple focal lesions of the skin, characterised by the formation of elevated indurated areas, which ulcerate and eventually cicatrise. In smears from the excised tissue of the sore fixed and stained in various ways, Wright found peculiar parasitic bodies to which he attributes the origin of the ailments. He proposes to call the parasite he met with *Helcosoma tropicum* and rejects the name *Sporozoa furunculosa* given to the bodies by Firth. The preparation of the staining fluid, and its application to smear preparations from tropical ulcer used by Wright, is as follows:—

"*Preparation of the Staining Fluid.*—Dissolve 0·5 grm. of sodium bicarbonate in 100 cc.m. of distilled water, and add to it 1 grm. of methylene blue (Grübler). Steam the mixture in an ordinary steam steriliser for one hour, counting the time after 'steam is up.' The heating should not be done in a pressure steriliser, nor in a water bath, nor in any other way than as stated. When cool, pour the mixture into a large vessel and add to it, stirring or shaking meanwhile, 500 cc.m. of a one to one thousand aqueous solution of eosin (Grübler, yellowish, water soluble). In the mixture thus formed a fine blackish precipitate will be visible in suspension, and on the surface a scum with yellowish metallic lustre will have appeared. Filter the mixture, collect the precipitate on the filter paper and allow it to dry thereon without washing. When thoroughly dry, dissolve this precipitate in pure methyl alcohol in a proportion of 0·5 grm. to 100 cc.m. of alcohol. This alcoholic solution is the staining fluid. It will keep indefinitely, as will also the dry precipitate. Precautions should be taken to prevent the alcohol from evaporating, for thus the solution may become too saturated and precipitates may form on the preparation in the process of staining. If the staining fluid deposits such precipitates it should be filtered and a small quantity of methyl alcohol added to it."

"*Method of Applying the Staining Fluid.*—Place the fresh cover-glass preparation in pure methyl alcohol and allow it to remain therein for two or three minutes. It is probably best that the preparation be allowed to dry in the air before placing it in alcohol. Next remove the preparation from the alcohol, grasp it with cover-glass forceps, and, without permitting it to dry, pour on to it as much of the staining fluid as the cover-glass will conveniently hold, and allow the fluid to remain one minute. Then add water to the staining fluid drop by drop until a delicate scum with iridescent metallic lustre becomes visible on its surface. Avoid diluting the fluid more than enough to just cause this scum to appear. If the staining fluid has been properly prepared, this scum will form before the fluid has been diluted enough to be transparent. The diluted fluid is to remain on the preparation for three minutes. During this time the most important part of the staining is effected. After this the preparation is to be washed with water until the nuclei of cells in the better-spread portions of the preparation appear well differentiated under a low power of the microscope and until any red blood corpuscles present have a yellowish or pinkish colour. This will probably require about a minute's washing. The washing in water is important, for it removes superfluous blue stain and brings out the differential staining of the elements in the preparation. Distilled water should be used, for tap water may spoil the staining. The quality of the staining and the progress of the differentiation can be easily judged by placing the preparation, film side uppermost, on a slide and examining it with a Zeiss AA or similar objective. When the decolourisation is judged sufficient, the preparation is to be thoroughly dried and mounted in balsam. Dried stain adherent to the upper side of the cover-glass may be easily removed with alcohol. The nuclei of cells should have a blue or deep lilac colour and red blood corpuscles a pink or orange colour. The cytoplasm of polynuclear leucocytes should show lilac-coloured granules and the cytoplasm of lymphocytes should have a robin's egg blue colour, while the protozoa should have the colour appearances described."

Microscopical examination of paraffin sections of some of the material which had been fixed in Zenker's fluid gave the following results: The lesion consists essentially of a very extensive infiltration of the corium and papillæ by cells, accompanied by atrophy and disappearance of the epidermis of the part. The infiltrating cells are plasma cells, various kinds of lymphoid cells, and large cells with single vesicular nuclei and a relatively large amount of cytoplasm in which are large numbers of the micro-organisms. These large cells, over extensive areas, are very numerous and constitute the principal part of the infiltration. They are regarded as proliferated endothelial cells. The micro-organisms are generally closely packed together throughout the cytoplasm of these cells, and occupy most of the available space between the nucleus and the cell membrane. They are almost exclusively in these cells. Many cells contain twenty or more micro-organisms. Only in very thin sections can the morphology of the individual micro-organisms be clearly made out. In these thin sections all the micro-organisms appear to be of spherical form, the cortical or pheripheral portions staining faintly with nuclear stains and the principal portion of the body remaining unstained, while the larger and smaller lilac-stained masses described in the smear preparations stain deeply with methylene blue and gentian violet.

REPORT BY H.M. AGENTS AND CONSUL GENERAL OF EGYPT AND THE SOUDAN IN 1903.

Infectious Diseases.

Egypt was entirely free from cholera during the whole of last year.

2,118 cases of small-pox occurred, of which 394 were fatal; 406,856 successful vaccinations were performed, as against 377,421 in 1902.

There was a good deal of diphtheria in Cairo during the autumn months, 286 deaths occurred, of which 15 were amongst Europeans. I am informed that, whenever the children in the house where one case has occurred have been treated with anti-diphtheric serum, the disease has not spread.

Plague appears to be diminishing; 303 cases were notified throughout Egypt, of which 160 were fatal, as against 481 cases and 291 deaths in 1902. The cases in 1903 occurred in the same towns and villages as those which suffered in 1902. On this subject Sir Horace Pinching writes:—

"The incidence of the disease has followed the same course as that observed in previous years, namely, the disease became more acute during the early spring months, and ceased during the late autumn. It is interesting to note that the period in Egypt when most cases of the disease appear corresponds with the period when rats are breeding. Almost invariably in the houses where cases occur, and in those adjoining, dead and dying rats are found. For this reason a general disinfection is made, not only in the infected house, but in all the houses adjoining. After such a thorough disinfection, it is rare that other cases occur.

"During 1902 there was a marked increase in the number of cases, as compared with 1901. It is therefore very satisfactory to note the decrease which has occurred during 1903. Without doubt, the strict supervision of infected districts, and the immediate measures taken, have to a great extent prevented plague from assuming serious proportions in Egypt. In my opinion, these measures must be continued for a number of years to come before we shall be able to consider Egypt safe from a serious epidemic of plague.

"For some years past, experience has shown that, in a country where sanitary police measures and general sanitation are in an advanced state of perfection, a few cases of plague, recognised at once as such, and dealt with on simple practical lines, need cause no great alarm as to the disease spreading and assuming a grave epidemic form as it has done in India. Plague, without doubt, like cholera, is a disease which spreads with alarming rapidity among a population devoid of all ideas of hygiene, and amongst which no rational measures are taken to deal with the early cases. It behoves the Government, therefore, to take all measures possible to keep so serious a disease as plague within reasonable limits. This can only be done by constant supervision, and by energetic measures with regard to the discovery of first cases, disinfection, and isolation of the sick."

The Cassel Trust.

I stated in my Report of last year that Sir Ernest Cassel had constituted a Trust, with a capital of £40,000, the interest on which was to be devoted to the treatment of those suffering from diseases of the eye.

Last July, Dr. MacCallan, an English ophthalmic surgeon, was appointed to be in charge of the work connected with this fund. Tents, equipment, and instruments were purchased. A native medical assistant, together with the necessary staff, were engaged, and a travelling hospital was erected at Menouf.

During the autumn, Dr. MacCallan visited several towns in Lower Egypt. Notices were sent out that an ophthalmic surgeon would examine and treat any cases of eye disease amongst the poor gratis. Large numbers of persons availed themselves of Dr. MacCallan's services. There can be little doubt that, by means of travelling hospitals, it will be possible to render assistance to many persons suffering from eye-diseases in distant villages, who would probably never go for treatment to the chief provincial towns.

The present dispensary will be kept at Menouf for two or three months more, and will then be transferred to some other district.

After some more experience has been gained, it is proposed to equip another similar dispensary, and to dispatch it elsewhere.

Rabies.

There can, I fear, be no doubt that rabies is increasing in Egypt. A total of 24 cases were treated at the Anti-Rabies Institute at Cairo, as compared to 12 in 1902. It is known that twenty-one dogs, two cats, and one horse were attacked.

The difficulty of enforcing preventive measures in connection with this subject—great in all countries—would be especially formidable in Egypt.

School of Medicine.

Since the introduction of the reforms which were undertaken on the advice of Dr. Cooper Perry, who visited Egypt in 1897, this school has been steadily growing in popularity; thirty-five students joined the school in 1903, as against twenty-seven in 1902. The total number of the students is at present ninety-eight.

Medical and Sanitary Department.

The health of the troops in the Soudan was generally good during the past year. The percentage constantly sick was only 2·83 of the total force. On the other hand, malarial fever is reported as having been "exceedingly prevalent" amongst the garrisons stationed in the Bahr-el-Ghazal Province. Egyptians, Captain Nickerson writes, "are hopelessly unsuited to this country on account of this fever and the subsequent anæmia and debility." The reason is not far to seek. "Mosquitoes swarm over every square yard of the Bahr-el-Ghazal during the rains. No one who has not felt or seen them at Meshra-el-Rek can have any idea of their numbers. As soon as the sun goes down, they appear like a flight of locusts, disappearing one hour after sunrise. During

the rains, when the country is full of swamps and the khors flooded, no system of drainage is possible."

That there is a very wide field open for the sanitary reformer in the Soudan cannot be doubted. Moreover, in view of the fact that the development of the country is retarded by the want of population, the question of sanitary reform is one of very special economic importance. I fear, however, that want of funds, amongst other reasons, must of necessity render progress in connection with this subject very slow. A commencement, has, however, been made. Some 11,000 people were vaccinated last year. Steps are being taken at Khartoum, and at some other places, to improve the water supply. Colonel Penton writes:—

"The destruction of mosquitoes and their larvæ, draining operations, and other measures in connection with the plan of campaign, are being energetically carried out at Khartoum, Kassala, El-Obeid, and certain stations on the White and Blue Niles, and even in the Bahr-el-Ghazal. It is too early to expect any very striking improvement in the records of sickness, but already there are encouraging signs of the success of the system; and, when thoroughly developed, I am confident that, in the larger and more important stations, there will be a marked diminution in the prevalence of these fevers, which cause so much sickness amongst the troops and civil population."

I should add that a number of good hospitals have been established, and that the people appear to be gaining confidence in them. 40,862 out-patients and 3,357 in-patients were treated in the Government hospitals in 1903, as against 26,591 and 2,395, respectively, in 1902. The number of paying patients is increasing. Last year they were considerably more numerous than those who received gratuitous treatment.

Small-pox.

It is well known that small-pox has of recent years committed fearful ravages in the Soudan. It is said —though I cannot vouch for the accuracy of the figures—that no less than 25,000 persons died of this disease in the town of Omdurman alone during the outbreak of 1885. Serious outbreaks also occurred in 1891 and 1899. A recent outbreak, which also threatened to be serious, was averted by the skill and energy of the British medical officers.

Dr. Christopherson, on whom the brunt of the work fell, has written an interesting report on the subject. He commences by saying: "It is not an exaggeration to say that a properly vaccinated person cannot contract small-pox."

I quote this remark lest it should be thought that any general argument against vaccination can be based on Soudan experience. Such is very far from being the case.

Dr. Christopherson then goes on to say that he does not think that "the decrease of small-pox in the Soudan during the last few years is to be attributed to vaccination. It is rather to be attributed to the protection afforded by previous outbreaks, the last of which, in 1899, was severe."

The difficulties in the way of dealing adequately with this subject are considerable. All the medical authorities are agreed that, in view of the prevalence of communicable disease of various sorts in the Soudan, arm-to-arm vaccination is dangerous. It has, therefore, been entirely prohibited.

On the other hand, calf lymph is not always available. It has to come from Cairo, and it frequently happens that the excessive heat of the Soudan renders it inoperative in a few days. Then, again, vaccination should only be performed by properly qualified medical officers, but the number of these is altogether insufficient to deal with so vast a country. An endeavour is, however, being made to train a certain number of the barbers who are to be found in almost every village. Their work is from time to time inspected by the medical officers of the districts.

Research Laboratories.

I mentioned in my last Annual Report that a laboratory had been attached to the Gordon College, and that, owing to the generosity of Mr. Wellcome, it had been richly equipped with all the appliances necessary for the conduct of scientific research.

Dr. Balfour, who was appointed Director of the laboratory, has now sent in a very full and valuable Report on the working of this institution. I regret that I am unable to reproduce it as an annex to this despatch, but as it contains much which is both of high general and special scientific interest, I trust that it will eventually be published in some other form.

I need here only say that Dr. Balfour's researches into the causes of the diseases which specially afflict animal and vegetable life in the Soudan, and into the means of prevention which may be adopted, amply justify the creation of the laboratory. I may add that Dr. Balfour has waged a vigorous campaign against mosquitoes at Khartoum. His report is specially interesting as showing what is possible in a populous town in the direction of carrying out Major Ross's system. I have already, in my Egyptian report, dwelt on the remarkable results attained in the fever-stricken town of Ismailia by the adoption of that system.

Veterinary Department.

I regret to say that it has been ascertained that the tsetse fly is an inhabitant of the Bahr-el-Ghazal Province. Major Griffith, the Principal Veterinary Officer of the Soudan Government, writes: "I found this fly on the banks of the Pongo, where the road to Dem Zubeir crosses it. The fly was not, till then, known to exist so far north." The discovery is of considerable importance, for I understand that this fly conveys a parasite which propagates sleeping sickness. Major Griffith adds: "This fly is never generally spread over a country, but is located in certain parts, called fly belts."

Memorandum by Sir H. Pinching on the recent Outbreak of Cattle Plague.

The Government, contrary to the advice of this Department, decided a few years ago to open cattle trade with Asia Minor, Russia, and Syria. It has always been the opinion of this Department that,

were this trade permitted, sooner or later Egypt would become infected with cattle plague, as it is well known the disease is practically endemic in all these localities.

The imported cattle from these countries have been landed at Alexandria and kept in quarantine parks there for a certain number of days, then slaughtered in a special shed at the Alexandria abattoir. As no suitable landing-stage exists near the quarantine parks at Mex, the beasts are obliged to be landed at some distance from them, and walked through the public roads of Alexandria to the quarantine parks, a proceeding which cannot be considered at all satisfactory considering the suspicious countries from which they come.

In the month of February last several cattle were said to have died at Gabbari, a quarter of Alexandria near the quarantine parks and abattoir. Certain of these animals were seen after death, but the disease from which they died was not recognised at the time as cattle plague, though from subsequent experience there is no doubt that they succumbed to that disease. After this outbreak nothing further was heard to cause alarm until the month of June, when a heavy mortality was reported among a herd of cattle belonging to Khalil Pasha Khayat at a farm near Abou Hommos, in Behera, and at no great distance from Alexandria.

Professor Bitter and a veterinary inspector were sent down to examine the animals, and they reported them to be suffering from cattle plague.

In the hope of limiting the disease, the whole herd was destroyed and the carcasses burnt, but only a short time elapsed before reports were received of cases occurring in other parts of Behera.

Every means were taken to limit the disease to the northern part of the country. Markets were closed, and, as far as possible, all traffic in cattle stopped, but the disease gradually spread, in spite of our efforts, throughout the Delta; in fact, our experience was the same as that of other countries has been, namely, that when once cattle plague breaks out in a country in which no cases have previously occurred for a considerable number of years, it spreads with alarming rapidity.

During the summer and the early autumn months the disease was confined to the Delta and the Province of Gizeh, and was not extremely virulent in form, as the animals could be tethered out in the open and exposed to the air and sun, but when it attacked the southern provinces of Beni-Suef and Minieh in the commencement of November, the virulent nature of the disease, as was anticipated, became much more marked. The weather was cold and damp and sick animals which were isolated were entirely neglected by their owners, many being left to die of starvation and neglect which, had they been carefully tended and fed, might have recovered. The fellaheen showed themselves absolutely apathetic and obstructive to all measures and precaution. They killed the animals which were slightly sick for food, sold the skins of animals which had died of the disease, invariably threw the carcasses of animals into the nearest water-course, to infect other villages and pollute the drinking water; in fact, they in every way helped to propagate he disease.

As Egypt is now thoroughly infected with cattle plague, there need be no hindrance in allowing cattle to be imported from countries where the disease exists, such as the Soudan, Turkey, Asia Minor, and Russia, and distributed throughout the country; if certain facilities are afforded to the trade by the Government, there is every likelihood of the restocking being undertaken by private enterprise.

Review.

Practical Handbook of the Pathology of the Skin. An Introduction to the Histology, Pathology and Bacteriology of the Skin, with Special Reference to Technique. By J. M. H. Macleod, M.A., M.D., M.R.C.P. London: H. K. Lewis, 1903, pp. 408, with 40 plates. Price 15s. net.

This book is written by one who understands his subject and knows how to impart his knowledge to others. Although it is impossible for medical men in practice to take up so time-consuming a subject as the pathology of the skin, yet they can follow with keen interest all Dr. Macleod has to tell. The first ten chapters are chiefly devoted to the practical details of histology, but from Chapter XI. onwards the medical practitioner will find much to interest him, and a wealth of information clearly conveyed. The illustrations are "teaching," and the book is altogether a credit to the author and to the publishers.

ɔngs to the order *Sapotaceæ* genus *Palaquium*, l although many species are put forward the ne Palaquium gutta is accepted for the gutta percha commerce. The plant is found in the southern f of the Malay Peninsula, the islands of the Rhio :hipelago, Borneo and Sumatra. Inferior species ,he tree, however, are met with in the Philippines, ebes, Java, and the northern half of the Malay ıinsula.

ʟOYALTY ISLANDS.—According to Dr. Noc, the group islands to the east of New Caledonia, known as Loyalty Islands, so far as climate is concerned, is al. Several diseases, however, detract from the adise-like environment which he pictures. The re prevalent are: dysentery, tuberculosis, leprosy, hilis, filariasis, influenza, and many skin diseases ned tonga. Noc states that the skin affections are stly papillomatous, the genital organs being the st frequently affected part of the body. The ction yields speedily to iodide of potassium. Noc ines to the belief that tonga is scrofulous in its ıities as syphilis is rare. To all appearances the ı affection described would seem to be of the ıre of yaws.

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s a means of causing mosquito narcosis, C. Sabba *ɜek Medical Journal*, December 15th, 1903) recomds burning a tablespoonful of a powder consisting ne part of nitrate of potassium with four parts of dered chrysanthemum and four parts of powdered root. This quantity suffices for a room of about) cubic feet.

of nursing at the Anglican Mission Station, British New Guinea. Amongst the diseases enumerated are: influenza, pneumonia, beri-beri, yaws, leprosy, hæmoglobinuric fever, measles, pemphigus and malaria. Paralysis and neuritis are stated to be common. The introduction of a feeding-bottle has caused astonishment amongst the natives. Previously when a mother died immediately after child-birth the child was buried with her, as there was no means of rearing it; now the motherless children are being saved.

THE CLAYTON DISINFECTOR.—The Clayton Company has secured the contract to disinfect the small-pox hospital ships "Atlas," "Endymion" and "Castalia" with "Clayton gas," which, being germicidal, will prevent any danger of infection in the event of these vessels being disposed of.

GUTTA PERCHA AND RUBBER IN THE PHILIPPINE ISLANDS.—P. L. Sherman edits the report on gutta percha issued by the Government of the Philippines. In 1656 gutta percha was first exhibited in London, but it was not until Dr. William Montgomery in 1822 brought some specimens from Singapore that serious attention was directed to the possible uses of the material. The commercial value of gutta percha was not appreciated until 1847, when Siemens made use of it to insolate subterranean and submarine telegraphic cables. The tree from which it is derived

Drugs and Remedies.

ARGYROL IN GONORRHŒA (PURDY, J. S., London, *Lancet*, 1903, December 19th, and *The Scottish Med. and Surg. Journal*, May, 1904).—A 5 per cent. solution of argyrol injected thrice daily into the urethra and retained for five minutes is, according to Purdy, efficacious in a few days in arresting discharge in anterior gonorrhœal urethritis, at any stage of the disease. The salt is a compound of silver and vitellin —a proteid extract from wheat. Argyrol is used in gonorrhœal conjunctivitis at a strength of 50 per cent. solution. The application of the solution is painless, it is bactericidal and causes no injury to the mucous membrane. Along with the urethral injection pulvis cubebæ is also given in the usual way.

EXODIN, a new laxative, which has found favour in many quarters. The preparation is tasteless, odourless, insoluble in water, not easily soluble in alcohol, and has a mild aperient action on healthy people, producing stools of pappy consistence. The preparation is by Messrs. Schering, Berlin. Each of the tablets contains 0·5 grm. of exodin. In water the tablets break up readily into a tasteless powder. For children a tablet is sufficient, but adults require to take from one to three tablets. In most adult cases, however, two tablets are sufficient to produce one or more semi-solid easy evacuations, which take place

usually within from eight to twelve hours, unaccompanied by pain. The administration of exodin is best effected as follows: The tablets are allowed to break up in a corresponding quantity of water, and this watery suspension of exodin is taken in a spoon, whilst constantly stirred. The glass is rinsed with a small quantity of water, which removes the remaining exodin, and this is then drunk. This method is to be preferred to that of swallowing the tablets whole even when this offers no difficulty, as when the exodin is suspended it reaches the stomach in the most complete possible state of division.—*The Therapist*, March and April, 1904.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis (uncinariasis).

Ashford, B. K. and King, W. W. Notes and Observations on Uncinariasis in Porto Rico. *New Orleans Med. and Surg. Journal*, March, 1904.—The eradication of the disease, according to Ashford and King, consists in prophylactic measures devoted to the establishment of latrines, wearing shoes and public education in regard to cleanliness of hands and utensils.

Ankylostomiasis.

Bentley, C. A. Some notes on ankylostomiasis in Assam.—Of 600 persons quite unselected and in many cases quite healthy in appearances Bentley found ankylostoma present in all save one individual. The number of worms harboured varied from six to many hundreds. The degree of anæmia present is no indication of the number of worms likely to be met with in the intestine. Eosinophile leucocytes in a differential blood count is a valuable indication of infection by ankylostoma and other worms. Bentley has abandoned thymol and male in the treatment of ankylostomiasis and administers instead beta-naphthol in two doses of 15 grains each.—*Ind. Med. Gaz.*, 1904, April.

Bacillus Dysenteriæ (Shiga).

La Fetra and Howland. A Clinical Study of Sixty-two cases of Intestinal Infection by the *Bacillus dysenteriæ* (Shiga) in Infants. *Archives of Pediatrics*, March, 1904.—The authors find the *B. dysenteriæ* present in diarrhœa in children during the summer months. Of the 62 children, 14 (20 per cent.) were in breast-fed babies who were not seriously ill.

Egypt.

Lord Cromer's Annual Report.—In Egypt the people are gradually gaining confidence in the hospitals and in European treatment of disease. It is not many years ago since no one would enter a hospital for treatment unless compelled to, and now, in 1903, some 25,162 patients were admitted. The prevalent ailments during 1903 were:—Smallpox 2,118 cases and 394 deaths; Diphtheria prevailed in Cairo, where there were recorded 286 deaths from the disease, including fifteen Europeans. Plague diminished during 1903, throughout Egypt 303 cases and 160 deaths from the disease were notified. During 1902 the cases numbered 481, and the deaths from plague 291. Plague occurred in the same towns and villages during 1902 and 1903. No cholera was reported from any part of Egypt during 1903. The general sanitary condition is manifestly unsatisfactory. In Cairo the death rate amounts to 42·5 per 1,000, and until sewerage is improved there is not much hope of any lessening in the death rate. In several of the larger towns the water supply is being placed on a more satisfactory footing, but unless there is some better system of disposing of sewage than by receiving and storing it in cesspools beneath and adjacent to the dwelling houses, an increased supply of water has its dangers.

Elephantiasis.

Elder, W. and Matthew, E. Elephantiasis and its Treatment, *Edinburgh Medical Journal*, December, 1903.—In a case of elephantiasis of the leg in a woman sometime resident in Burmah, Elder and Matthew found an effective treatment to be:—Rest, massage, the constant current and electrical heat baths applied daily. This treatment reduced the size of the limb to almost normal limits; after three months of this treatment an elastic stocking was worn.

Hæmoglobinuric Fever.

Hopkins, F. G. Hæmoglobinuric Fever: Its Ætiology, Diagnosis and Treatment, the *Dublin Journal Medical Science*, 1903, June. According to Hopkins, hæmoglobinuric fever is practically identical with malaria in its geographical distribution. The disease does not occur in persons who take quinine regularly, and is not due to taking quinine. Hopkins recommends Gouzieu's treatment, namely, one subcutaneous injection daily of from 100 to 300 grammes of standard saline solution, 7 grammes of pure salt to 1,000 grammes of water. The injections are best made in the hypogastric region.

Heat Stroke.

Esch, in an article entitled "Ueber einem Fall von Hitzsehlag au Bord," in the *Archiv. fur Schiffe und Tropen Hygiene*, 1904, February, points out that a not infrequent premonitory symptom of heat stroke is attacks of cramps in the upper and lower extremities. Esch's patient was a stoker on board an ocean steamer, and twenty-four hours previous to the actual stroke, cramps in the limbs were complained of.

Horse Sickness in Zanzibar.

Friedrichsen. Die Pferdesterbe in Ostafrica, *Archiv. fur Schiffe und Tropen Hygiene*, February, 1904. Since 1899 an epidemic disease has recurred annually amongst horses in Zanzibar. The symptoms are: congested conjunctivæ, œdema around orbits, watery discharge from nose, swollen upper lip, loss of

appetite, dysphagia, occasionally tenderness of lymphatic glands in neck, cough at times, weakness, hurried breathing and quick pulse, swelling of legs.

The disease is transmissible by inoculation; so far no blood parasite has been found to account for the disease which, however, is believed to be identical with South African horse-sickness.

Intestinal Parasites.

FEARNSIDE, C. F. Intestinal Parasites as Factors in the Mortality of Prisoners in the Cannanore and Rajahmundry Jails, *Indian Medical Gazette*, April, 1904.

(1) *Ascaris Lumbricoides.*—From observations on prisoners in jail, in the northern part of the Madras Presidency, Fearnside comes to the conclusion that many ailments are due to the presence of ascaris lumbricoides in the intestine. By the administration of santonin the number of cases of dysentery, muco-enteritis and diarrhœa have been appreciably reduced amongst prisoners in the jail. Along with the ascaris lumbricoides Fearnside remarks that oxyuris vermicularis, trichocephalus dispar and the ankylostoma duodenale are generally associated in the same individual. In birds he found also tapeworm, echinorrhynchus and ascarides. Frogs were found infested by a parasite resembling the rhabdonema intestinale met with in man in cases of Cochin China diarrhœa.

The signs and symptoms of ascarides infection Fearnside divides into three stages: (1) Headache, a feeling of faintness, dyspepsia, disinclination for food, and a peculiar undulatory movement in the abdomen mark the first stage; (2) muco-enteritis develops, accompanied by vomiting, if the worm has its habitat high up in the intestine, and diarrhœa if it happens to be located low down; a febrile condition and pain in the right iliac region are present and tend to mistakes in diagnosis; (3) dysentery due to a septic condition of the large intestine, the result of ascarides infection, is apt to ensue, and perforation of the intestine, peritonitis or pyæmia may result. Of the sequelæ Fearnside mentions boils, chronic diarrhœa, chronic dysentery, meningitis, peritonitis, perforation of the intestine, abscess of liver, nephritis, anæmia, herpetic eruptions in the abdomen, dropsy and emphysema of the gut. The treatment consists of santonin, followed by a purge.

Fearnside's conclusions are: (1) Original infection takes place in children, and in adults in ill-health; (2) the disease is continued by a process of auto-infection, the ova, with the live embryo, having been found under the dirty nails of persons harbouring the parasite; (3) sanitary measures to be recommended are collection and burning of the fæcal matter, when possible, or $1\frac{1}{2}$ feet nightsoil trenching; (4) as a prophylactic measure the distribution of packets of santonin and calomel in 5 grains doses.

(2) *Malaria, Ankylostoma Duodenale, Ascaris lumbricoides.*—Fearnside, in an endeavour to elucidate the causes of periodical outbreaks of sickness among prisoners in the Rajahmundry Central Jail, concludes that malaria was the chief cause of the sickness, and that the presence of intestinal parasites, especially ankylostoma, added to the intensity of the anæmia induced.

In 1887 beri-beri was alleged to be prevalent in the jail, and the simultaneous appearance of ankylostoma caused an inference to be drawn as to the cause and effect of these diseases that has, by fuller investigation, been proved incorrect. As a matter of fact, beri-beri has been confused with signs and symptoms produced by the presence of malaria and intestinal parasites in the same individual.

LANE, Clayton. Intestinal animal parasites in Behar and Orissa. *Indian Medical Gazette*, April, 1904.—In the Chupra and Puri Jails, Lane, from an extensive and careful examination of the stools, found the following parasites in the following proportions:—

Intestinal Parasites.	Chupra Jail, 153 prisoners examined.		Puri Jail, 44 prisoners examined.	
	Actual numbers	Percentage.	Actual numbers	Percentage.
Uncincaria duodenalis...	109	71·24%	32	72·72%
Ascaris lumbricoides ...	91	59·47%	19	43·18%
Trichocephalus dispar...	15	9·8%	6	13·64%
Oxyuris vermicularis ...	5	...	5	..
Tænia solium ...	4	2·61%	0	...
Rhabdomena larvæ ...	2	1·3%	7	15·91%
Tænia nana ...	1	0·7%	0	...
Tænia flavo-punctata ...	1	0·7%	1	2·27%

MADDOX, R. H. A Note on the Occurrence of Intestinal Parasites in Ranchi, Chota Nagpur, India, *Indian Medical Gazette*, April, 1904.—Of 366 prisoners in the Jail whose stools were carefully examined during 1903-4:—(1) 244, or 66·6 per cent., contained ankylostomum duodenale; (2) 25, or 6·8 per cent., contained ascaris lumbricoides; (3) 14, or 3·8 per cent., oxyuris vermicularis; (4) 3, or 0·8 per cent., tænia solium; (5) 1, or 0·27, trichocephalus dispar.

Leprosy.

SAKURANE. Histology of Leprosy of the Skin, Japan, *Zeitschr für Derm. und Syph.*, March, 1903.—Professor Sakurane, of Japan, states that: (1) The bacilli in leprosy are both extra- and intra-cellular; (2) the extra-cellular bacilli are arranged in long lines in the skin; (3) the so-called "globi" or "lepra cells" are merely sections of these long lines at intervals of their course; (4) in some instances no lepra-bacilli can be found in the skin lesions, and it is possible that anæsthetic lesions in leprosy may be due directly to bacilli acting on the nerve endings in the skin or indirectly on the nerve trunk, or on the central nervous system.

Malaria.

ROWLEY, MARY E., *Bull. Johns Hopkins Hosp.*, Jan., 1904.—In æstivo-autumnal fever, in addition to the ring-shaped and ovoid bodies, and the crescents, Mary E. Rowley mentions the presence of two additional varieties of parasites—(1) A sausage-shaped, intra-corpuscular parasite, presenting scattered pigment occasionally collected at one end, and dotted chromatin lying parallel to the long axis. This body

is regarded as a stage in the development of ring-shaped forms into crescents. (2) Between the above and the ultimate crescent form yet another variety is described, in which the parasite assumes a curved outline with dots of chromatin at one end, and the pigment gathered at the periphery.

Malaria Prophylaxis.

BATTARA, R. Prophylaxis against Malaria, *Revista Medica*, Supplement, 1903, Comm. 15.—Battara's plan of malaria prophylaxis is based on the absolute cure of all cases of malaria, whether acute or chronic. The experiments were made in the town of Nona, Italy. The inhabitants almost all suffer from malaria, with splenic enlargement and profound anæmia. The preparation exhibited by Battara consisted of a pill composed of quinine bichlorate, citrate of iron, arsenious acid and a bitter extract. This pill, in varying strengths according to the age of the patient, was administered once daily foi fifteen days, and continued in smaller doses for some time afterwards. Under this *régime* the spleen diminished and attacks of fever were reduced to such an extent that only five out of 213 persons who submitted themselves to the treatment had fever; on the other hand, of 40 persons who refused treatment 30 suffered from fever.

Malta Fever.

In the British Army Report for 1903, it is stated that out of 18,470 troops quartered in the Mediterranean 315 cases of Malta fever occurred; 238 of these cases contracted their illness at Malta.

Piroplasma Bigeminum.

LINGARD, A., Imperial Bacteriologist, India, states, in a letter to the *Indian Medical Gazette*, April, 1904, that since he reported on the presence of the piroplasma parasite in 1902 in cattle, piroplasmata have been described as affecting animals in various countries. He has found piroplasmata in cattle, horses, camels, sheep, goats and kids, dogs, rabbits and guinea pigs. In his own blood and in the blood of several native assistants in his laboratory Lingard has also found piroplasmata. In the blood of a prematurely-delivered foal he also found the parasite.

Plague.

PREVALENCE OF THE DISEASE.

INDIA.—The deaths from plague in India during the weeks ending April 9th and 16th, numbered 47,759 and 46,812 respectively.

CAPE COLONY.—During the weeks ending April 2nd, 9th, 16th, and 23rd, the fresh cases of plague numbered 2, and the deaths 1 only.

TRANSVAAL.—Up to May 7th, the total number of cases of plague (suspected and proved) numbered 185, and the deaths from the disease 89.

HONG KONG.—During the weeks ending April 16th, 23rd, and 30th, and May 7th, the fresh cases of plague numbered 3, 5, 25 and 29, and the deaths from the disease 3, 5, 25 and 26.

MAURITIUS.—During the weeks ending April 21st and 28th, May 5th and 12th, but one fatal case of plague was reported.

AUSTRALIA.—Plague is reported to exist in Queensland. A case of plague occurred in Sydney on March 10th.

FORMOSA.—Cases of plague were reported from the Tainan districts during March and April.

Snake Bite.

SMYTH, JOHN. Cobra Bite: Recovery, *Indian Medical Gazette*, April, 1904.—Hindu woman, 36, bitten by cobra, April 26th, 1903, on big toe. The toe was ligatured, wound incised, washed with Condy's fluid, liq. strychnine mins. x. injected hypodermically every five minutes (four doses in all). As coma continued for half-an-hour after last dose 20 cc. anti-venine was injected; half-an-hour later a second dose of 10 cc. was given. Patient gradually recovered.

ROBINSON'S PATENT BARLEY.

THIS well-known and universally appreciated preparation of barley is admirably suited as an addition to milk for infants in tropical countries. The difficulties of obtaining suitable milk in a tropical, compared with a northern European country, are enormous. Native cows' milk is in most districts of the Tropics not only difficult to obtain but is always of indifferent quality. The milk of the buffalo is unsuitable for children and even for adults, and it frequently happens that tinned milk is alone obtainable. Under such circumstances the addition of barley water to milk, be it either cows' or tinned milk, is of great advantage. Moreover, should diarrhœa, muco-enteritis or dysentery, which so commonly attack children in warm climates, develop, the administration of plain barley water is of all forms of dietetic treatment the most efficacious. We are glad to see that Messrs. Keen, Robinson & Co., Ltd., London, E.C., who produce Robinson's barley and groats, give wise counsel to young mothers. In the circular they issue with their preparations of barley and of groats they deprecate mothers giving up feeding their children, and in no way pretend, as many infant food manufacturers do, that artificial methods of feeding are more "scientific" than the "old-fashioned" plan that used to be in vogue in our mothers' time.

Appointments, Change of Station, Leave, &c.

Medical men in practice abroad would find it convenient to send intimation of their movements to appear in this column; also their addresses when in Great Britain.

Dr. O. D. HONIBALL, Government Medical Officer, British Guiana, has arrived in England on leave.

Dr. J. W. PENNEFATHER has been appointed a Police Magistrate for the Province of Manitoba, Canada.

Sir DAVID PALMER ROSS, Surgeon-General of British Guiana, who has been granted a further extension of leave on account of ill-health, will retire from the Service on pension in August.

Literary References.

TROPICAL DISEASES.

MALARIA.

Blessich, T. Lotta contro la febbre intermittente; un po' di storia, considerazioni e proposte, *Clin. mod.*, Pisa, 1903, vol. ix., p. 595.

Bucco, M. Febbre palustre in un inferno splenectomizzato; considerazioni sul reperto istologico del sangue, *N. Riv. clin-terap.*, Napoli, 1903, vol. vi., p. 617.

Celli, A. Die Malaria in Italien im Jahre 1902. Epidemiologische und prophylaktische Forschungen, *Arch. f. Hyg.*, München and Berlin, 1903, vol. xlviii., p. 222.

Chirone, V. I sali di chinina per l' infezione malarica nella gravidanza, *Pratica d. med.*, Naples, 1903-4, vol. iv., p. 129.

Christy, C. Malaria Prophylaxis for Travellers, *J. State M.*, London, 1904, vol. xii., p. 24.

Creutz, F. A propos de l'influence du traumatisme sur le reveil de la malaria, *Bull. méd. de l'Algérie*, Alger, 1903, vol. xiv., p. 474.

Drouillard, F. Les injections de quinine et en particulier les injections intra-musculaires de chlorhydrate neutre dans le traitement du paludisme, Bordeaux, 1903, 71 pp., 8 ch., 8vo.

Fraser, T. A. Treatment of Malarial Fever, *Am. Pract. and News*, Louisville, 1903, vol. xxxvi., p. 284.

Gergö, I. A malaria-parasiták endogen fejlödési menete, észlelt esetek kapcsán (The endogenous development of the malarial parasite, from observations), *Orvosi hetil.*, Budapest, 1903, vol. xlvii., pp. 629, 646, 662, 677.

Giltner, H. A. Abscess following Malaria, *Wisconsin M. Recorder*, Janesville, 1904, vol. vii., p. 17.

Lenz, O. Die Malaria-Assanierung der Aussenwerke der Seefestung Pola, *Wien. klin. Wchnschr.*, 1904, vol. xvii., p. 14.

Lerch, O. Malaria followed by Interstitial Nephritis and Peripheral Neuritis, *Amer. Med.*, Phila., 1904, vol. vii., p. 107.

Lombana Barrenche, J. M. De la acción preventiva de la quinina en el paludismo y purificación de las aguas potables por el yodo metálico, *Rev. méd. de Bogotá*, 1903-4, vol. xxiv., p. 65.

Mallannah, S. Hæmoglobinuric Fever, *Brit. Med. Journ.*, London, 1904, vol. i., p. 247.

Marc, S. Die Malaria in Turkestan, parasitologisch-klinische Studien, *Ztschr. f. Hyg. u. Infectionskrankh.*, Leipzig, 1903, vol. xlv., p. 365, 1 pl.

Mari, A. Per la profilassi antimalarica, *Gazz. d. osp.*, Milan, 1904, vol. xxv., p. 75.

Maurakes, K. Περὶ τῶν αἰτίων τῶν ἐν 'Αθήναις ἐπιπολαζόντων ἐλειογενῶν κονώπων, 'Ιατρικὴ πρόοδος, 'Εν Σύρῳ, 1903, vol. viii., p. 327.

Mine, N. Die Malaria in Formosa und ihre erfolgreiche Bekämpfung unter der japanischen Besatzung, *Arch. f. Schiffs- u. Tropen-Hyg.*, Leipzig, 1904, vol. viii., p. 21.

Muratori, A. I sali di chinina per l' infezione malarica gravidanza, *Pratica d. med.*, Naples, 1903-4, vol. iv., p. 74.

Newajdomski, P. M. Ueber die Behandlung der Malaria mit subcutanen Chinin-Injektionen, *Allg. med. Centr.-Ztg.*, Berlin, 1904, vol. lxiii., p. 41.

Ollwig. Bericht über die Thätigkeit der nach Ostafrika zur Bekämpfung der Malaria entstandten Expedition, *Ztschr. f. Hyg. u. Infectionskrankh.*, Leipzig, 1903, vol. xlv., p. 403.

Papakosta, G. A Case of Concurrent Attack of Urticaria and Malarial Fever, *Lancet*, London, 1904, vol. i., p. 92.

Ravarit. Vaste rétraction cicatricielle d'origine paludique, *Poitou méd.*, Poitiers, 1903, vol. xvii., p. 265.

Ross, R. Leishmania Donovani found in Kala-azar, *Brit. Med. Journ.*, London, 1904, vol. i., p. 160.

Sergent, E. Sur la lutte contre les moustiques; une campagne antipaludique en Algérie, Paris, 1903, 84 pp., 5 pl., 8vo.

EXCHANGES.

Annali di Medicina Navale.
Annali d' Igiene Sperimentale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Transactions of the American Microscopical Society.
Treatment.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Publishers.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

THE "VOMITING SICKNESS" OF JAMAICA.

By R. S. Turton, M.R.C.S., L.R.C.P.

There occurs in certain parts of the island of Jamaica in the colder months of the year a form of disease which is interesting in its clinical features, and the true cause of which is, I think, unknown. It is commonly known as the "vomiting sickness." It almost altogether attacks children from a few months to nine or ten years old, though I have seen fatal cases in young adults. This, however, is rare. The disease is practically confined to the children of the poorer classes, who commonly live in ill-ventilated wattle-and-daub huts with earth floors, and whose nightly practice it is to tightly close every opening which can admit air into a usually over-crowded apartment. I take a typical instance ending fatally.

A family of from five to ten or more asleep in one of these dwellings is disturbed at midnight by one of the children. He says he "feels bad in his belly," and not long after he vomits, bringing up first the contents of his last meal, and later frothy mucus, and at once collapses. Cold sweat breaks out, the pulse becomes weak and rapid, respirations shallow and irregular. The child is evidently very ill. The frightened parents call for help, and the child is probably "rubbed up with rum and camphor," as the vernacular has it; some of this is applied to the nostrils. The malady then takes one of two courses. In the first form, while the semi-unconscious child is still in his mother's arms, she is startled with the onset of convulsions, which continue till death occurs in a few hours. In the other case, stimulation has apparently had a good effect, and the child recovers his senses and lies about the house, languid and weak, but apparently progressing favourably. In the afternoon or at night convulsions suddenly come on, and death follows. The matter is reported to the police, and a *post mortem* is ordered.

On the arrival of the district medical officer at the spot (which, on account of distance, delay in informing the police, and necessary formalities, is rarely less than eight or ten hours after death, and frequently much more), he is informed that another child has been attacked, or it may be more than one, and he is shown a child stretched out on its back, eyes half open, conjunctiva slightly sensitive; occasionally giving a deep inspiration, otherwise respiration almost imperceptible; temperature normal or slightly raised; pulse about 90, steady and regular; heart-sounds clear; occasional slight convulsive stiffening of the limbs, but no violent convulsions. On turning the body on one side, frothy mucus, possibly bloodstained, oozes from the lips. Râles heard over both lungs. Lips, inside mouth and palpebral conjunctivæ, red, and no marked cyanosis of nails. The deep inspirations gradually get fewer and cease; the pulse beats steadily for a minute or so after the last inspiratory effort. One or more of the other children show early symptoms; with prompt treatment they usually recover. In this way a household will lose two or three of its younger members in a day or two, possibly inside of twelve hours.

This disease is rarely seen before December or after March. I do not know of any case occurring in the towns—it is a country disease; I do not remember two or three fatal cases occurring in a house properly floored and ventilated; either sex is liable to be attacked. I understand that in the parish of Trelawny it has appeared every year in the cold months, and has done so for years past; it occasionally assumes epidemic form in other districts. At no time is an enormous proportion of children in any one district attacked, and it is an undoubted fact that if appropriate treatment be given sufficiently early the mortality is very small.

Post mortem.—The appearances are invariably the same, and are, I think, due to general venous congestion. Marked engorgement of the vessels of the membranes of the brain and cord; pia mater usually clear; no great quantity of fluid in the ventricles. Engorgement of the lungs, which contain air; usually some hypostatic congestion. The larger bronchi and the trachea contain froth. The left heart is always empty, or nearly so; the right filled with decolourised clot often extending far into the vessels. The liver, spleen and kidneys also congested, oozing freely on section. The bladder is usually distended with urine, sometimes up to the umbilicus. The inner surface of the stomach has a thickened appearance, the rugæ standing out, and a slimy, dark mucous substance adhering to it. On removing this, the mucous membrane is seen to be congested in spots and small patches. In nearly every case the small intestines contain ascarides, sometimes in enormous numbers, and often these worms are found in knots of from five to a dozen or more, distending the portion of gut near them. They are invariably mixed up with thick, semifluid substance, usually dark, but occasionally a bright coppery-red colour, and often the contiguous part of the gut is acutely inflamed, the lesion strictly limited to that part where the knot of worms is found.

It is found that early and free stimulation, warmth, followed by a dose of calomel and castor oil (so as to ensure free action of the bowels and expulsion of worms, if any), will probably avert any ill-effects, but to be of use the remedies used must be administered before the convulsive stage sets in.

It seems to me that the disease is caused by a toxin affecting the respiratory centre. It is rare that one has an opportunity of being present at death. Decomposition soon sets in in a tropical country, and as soon as it is known that a case has occurred in a district, the police are supplied with medicines, so as to save time, which is all-important, and these they distribute. Opportunities for investigation are thus few and far between.

To sum up: We have here a disease which occurs only in the cold months, in country districts, among the poorer classes and unhealthy surroundings; may attack more than one member of the family, either at the same time or at intervals of hours up to a day or two; usually attacking children irrespective of sex; presenting a longer or shorter period of *malaise* followed by vomiting, convulsions, and death in a few hours; showing, *post mortem*, signs of gastro-intestinal

irritation, and usually infection with ascarides in large numbers; killing by respiratory failure; and having a very small death rate in cases where early treatment has been given.

TABES MESENTERICA AND CEYLON SORE-MOUTH AND DIARRHŒA.[1]

By W. Wijeyesakere, M.R.C.S.Eng.
District Medical Officer, Ramboda, Ceylon.

I propose to bring to your special notice the striking similarity of the symptoms manifested in patients suffering from tabes mesenterica and Ceylon sore-mouth and diarrhœa, and to prove to you, to the best of my ability, that the two diseases are identical, although they have different names.

On January 20th, 1900, I read before your Association a paper on the symptoms and treatment of the latter disease, and therein I detailed the attempts I made to prove that the disease was of tubercular origin. During the last three years I have accumulated many facts, with which I hope to convince you that the two diseases are the same. They have prevailed in this island from time immemorial, under the vernacular names of "Māndan and Grahaney." The former refers to acute cases of tabes mesenterica and the latter to chronic cases of the same disease, or Ceylon sore-mouth.

The following symptoms are common to both these diseases:—

(1) *Diarrhœa* is an unfailing symptom in some form. In the acute stage, the motions usually consist of mucus of a green or white colour, occasionally streaked with blood. The parents of native children suffering from it describe this symptom most graphically, by stating that the child passes motions like a fowl, indicating that they are frequent and scanty. In the sub-acute stage the motions are yellow and watery, and in the chronic stage copious, semi-fæculent and fermented, and out of proportion to the nourishment imbibed.

(2) *Progressive and Rapid Wasting* and consequent loss in weight, are common to each stage of the disease.

(3) *Soreness of the Tongue and the Buccal Cavity.*—In the acute stage the lips and cheeks are swollen, pustules are found on the tongue and buccal cavity; in the chronic stage there is denudation of the epithelium of the tongue and buccal cavity, the tongue looks raw and fleshy, and is fissured and sometimes pigmented.

(4) *Falling off of the Hair* and furfuraceous desquamation of the skin of the scalp, is common to all stages of the disease.

(5) *Nyctalopia* is an incipient symptom of great diagnostic value, which lasts through all stages of the disease. In the acute stage there is injection of the conjunctivæ, and shedding of epithelium from the ocular conjunctiva, giving it the appearance of fish scales, which the natives describe as "corapothu," meaning "fish scales." In the sub-acute stage there is ground-glass appearance of the cornea, ulceration of the cornea, which, if not properly attended to, terminates in suppurative pan ophthalmitis. The inflammation from the eye, as a rule, also extends to the lachrymal apparatus, and through it to the Schneiderian membrane of the nose. In the former, it causes inflammation of the lachrymal sacs, and sometimes suppuration; from the nostrils a constant running of thin mucus. In the chronic stage there is the chlorotic or icteric conjunctivæ, and the well-marked arcus or annulus senilis. In a recent paper read before your Association by Dr. W. H. de Silva, the eye specialist in Colombo, he attributed these eye symptoms to a toxin developed by eating ill-prepared and ill-cooked dried and salted fish. This theory does not hold good in the case of Europeans suffering from this disease as, though they suffer from these eye symptoms, they do not usually eat fish of the kind mentioned. I am of opinion that these symptoms are due to tubercular meningitis, through the extension of the infection, commencing in the mesenteric glands, from the intestines, slowly spreading to the retroperitoneal glands, then through the receptaculum chyli, and finally to the meninges of the brain. It is difficult not to be convinced of this fact, when holding a *post-mortem* examination on the body of a patient who has died from this disease.

Before finishing with the eye symptoms, a word of explanation is necessary as to the cause of icteric conjunctivæ. I attribute it to the swelling of the mucous membrane of the duodenum, due to the tubercular ulceration, causing obstruction of the orifice of the common bile duct, and also to the pressure of enlarged glands in the course of the bile duct, causing re-absorption of bile and the deposition of bile pigments in the conjunctivæ.

(6) *The Right Side of the Heart is as a rule Dilated.*—The heart's impulse is diffused. In those patients who are anæmic there is visible pulsation in the jugulars, and in the tracheal fossa. A hæmic bruit is heard, with its maximum intensity at the apex of the heart. Anæmia, in these cases, is an unfortunate symptom, as it is attributed by some to round worms in children, and by others to malarial cachexia or to dochmius duodenalis, as if tubercular disease could not cause anæmia.

(7) *The Liver is Contracted or Enlarged;* more often the former. On the *post-mortem* table it is invariably found to be undergoing fatty degeneration.

(8) *The Abdomen is found to be Retracted* in those cases in which the disease has spread to the brain; otherwise it is distended and puffy. If, however, tubercular peritonitis complicates the case, there is effusion into the peritoneal cavity. Sometimes, in chronic cases, the tubercular infection extends through the kidneys to the bladder and prostate. In such cases patients suddenly, without any apparent cause, complain of retention of urine; this is followed by swelling of the scrotum and penis. Finally, all the symptoms of acute cystitis supervene, till death puts an end to the suffering of the patient.

The following history of a patient is a case in illustration:—

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[1] Read before the meeting of the British Medical Association, Ceylon Branch, November 27th, 1903.

Arunasalem, male, aged 14, was admitted into the hospital on September 21st, 1903. He was profoundly anæmic; chest extremely emaciated; face, abdomen and lower extremities swollen; hair fallen off; scalp desquamating; conjunctivæ icteric; tongue denuded of epithelium; right side of heart dilated; pulse small, quick and soft; liver contracted; glands in the groins enlarged; the mesenteric glands can be distinctly felt enlarged. He had five yellow, watery motions a day; low fever, temperature never rose above 99° F. By October 8th, under careful treatment and diet, the symptoms of diarrhœa, fever and swelling disappeared. He was then placed under a course of iron in the form of Blaud's pills, with the object of curing the anæmia. On the night of October 19th, after a continuous residence of twenty-nine days in the hospital, he complained, without any apparent cause, that he was unable to pass urine, and by the following morning his scrotum and penis were considerably swollen; he voided urine drop by drop and very frequently, and complained of pain during micturition. The urine was pale in colour, alkaline in reaction, specific gravity 1010—pus and phosphates were present.

(9) *Progressive and slow Enlargement* of one or more joints of the upper and lower extremities are present, mostly in sub-acute and chronic stages of the disease.

(10) *Inflammation and Enlargement* of the sebaceous glands of the skin appear in the first stage of the disease. In the sub-acute and chronic stages there is generally induration, but sometimes the glands suppurate and form ulcers, especially in the face and lower extremities. In jail hospitals, when indurated sebaceous glands appear in the skin of prisoners, it is attributed to the eating of food cooked in copper utensils; but as the Ceylon Moorman always uses copper utensils for cooking purposes, and as they do not all suffer from this condition of enlarged glands, this hypothesis does not hold good. Not long since a patient was admitted into the hospital suffering from 158 ulcers in various parts of the body and as many more scars of healed ulcers, as a result of the ulceration of the sebaceous glands. The vernacular name of this general enlargement of the sebaceous glands of the skin is "māndan gadu," and the natives consider it as a pathognomonic symptom of the disease.

I was once called in to see a European planter's youngest child, the seventh or eighth in the family, said to be suffering from measles. On examination, I found her to be suffering from enlarged sebaceous glands, which at first appeared in succession as inflamed red spots, which remained as hard nodules when the inflammation subsided. Subsequently the child suffered from all the other symptoms of this disease. This child was brought up on condensed milk. Later the father developed sore-mouth and diarrhœa. On my pointing out to him that he had probably become infected as a result of kissing the child too often, he abstained from this practice, and with the help of appropriate treatment he recovered. I may mention that the child ultimately recovered.

(11) *Low fever* is present in all stages of the disease, but not continuously.

I will now submit for your consideration the histories of two patients treated by me in the Ramboda District Hospital, for tabes mesenterica, with fatal termination. The diagnosis of their disease was verified by the acting director of the Bacteriological Institute, Colombo, by his detecting the presence of the tubercle bacillus in the samples of urine sent from the patients when still living; the diagnosis was also verified by *post-mortem* examination.

Case 1.—The following history is that of a patient who was sent by a European planter, who informed me that he had been treating the patient for anchylostomiasis. I carefully examined the motions of this patient for several successive days, and failed to find a single dochmius or its ovum. I then despatched specimens of his urine and sputum to the director of the Bacteriological Institute on May 6th, 1903. On the ninth day, he reported the presence of the tubercle bacillus in the urine.

History.—Angamuttu, male, about 25 years of age, unmarried, Tamil estate labourer. He never suffered from malarial fever either in Ceylon, or his own country, Southern India. No information could be obtained as to his family history. He complained, on admission, of diarrhœa and general weakness, and stated that he had been ill three months.

Symptoms.—Face puffy, conjunctivæ icteric; tongue denuded of epithelium and fleshy-looking; chest emaciated; right side of heart dilated; pulse small, quick and soft; abdomen distended with fluid; lower extremities swollen; sebaceous glands of the skin enlarged. He had about eight motions a day, yellow, copious and watery. He lingered forty-four days in the hospital till death put an end to his sufferings.

Post-mortem Examination.—The chief naked eye changes found at the autopsy were :—

(1) Fatty degeneration of the heart.

(2) Liver contracted and undergoing fatty degeneration.

(3) The presence of fluid in the peritoneal cavity, due to peritonitis.

(4) Atrophy of the mucous membrane of the small intestines.

(5) Very great enlargement, induration and caseation of the mesenteric and retroperitoneal lymphatic glands.

(6) Congestion of the kidneys the immediate cause of death.

Case 2.—The specimens of the sputum and urine of the patient were forwarded to the director of the Bacteriological Institute on May 21st, 1903, and on June 23rd, 1903, reported the presence of the tubercle bacillus in the urine.

History.—Kandasamy, male, about 35 years old, Tamil estate labourer. He was ill three months on the estate, during which time he received treatment from the estate dispenser on Labookellie Estate. On admission into the Hospital he complained of cough and diarrhœa. He never suffered from malarial fever either in Ceylon or Southern India. Nothing elicited about his family history, except that several younger brothers and sisters had died, but he did not know the cause of death. He was extremely emaciated. On examination of the chest, nothing abnormal was found. He had about five copious, yellow, watery motions a day. Throat and tonsils ulcerated; extremities cold and swollen; pulse feeble; abdomen puffy; liver en-

larged; conjunctivæ injected; arcus senilis well marked; the cornea had the appearance of ground glass; constant running from the nose. The patient never rallied under treatment, but died the third day after his admission.

Post-mortem Examination.—The chief naked-eye changes found at the autopsy were:—

(1) Liver lardaceous and enlarged.

(2) Small intestines congested.

(3) The mesenteric and retroperitoneal glands enormously enlarged, indurated and some were caseating.

(4) Membranes of the brain congested—the immediate cause of death.

(5) The sheath of the optic commissure and optic nerves were a pale fawn colour.

At the *post-mortem* table in these cases, there is one pathological condition invariably and constantly present, namely: the enlarged, indurated and caseating mesenteric and retroperitoneal glands, for which reason I have retained the name of tabes mesenterica for the disease. During the year 1902 seventy deaths occurred in the hospital, and out of these fifty had diseased glands. During the current year, up to the end of October, there had been thirty-two deaths, twenty-two of which had diseased glands. This shows how commonly the disease prevails among estate labourers. In the first instance it is a disease of children. Coolie children often contract it from the filthy habit the coolie women have of daubing the buccal cavity of the children with foul dirt, as a prophylactic against this very disease. The children also play in the dusty compounds into which the coolies (some of them probably suffering from sore-mouth) expectorate, and where the children and fowls commit themselves. As there are generally one or more persons suffering from this disease in some form in every coolie line, infection is naturally spread by this means.

Fresh Milk a Prophylactic.

Contrary to the theory of Dr. Nathan Raw, that bovine tuberculosis is the cause of this disease, due to drinking infected cows' milk, I find, in this country, where the disease is so common among coolie children, that they rarely get fresh cows' milk to drink. I notice, however, that among the children of Kanganies, who can afford to keep a cow and feed the children with the milk, the disease is rarely contracted. The following is an instance of cows' milk acting as a prophylactic against the disease.

Mr. J. W. Gosset, of Helbode Estate, Pusselawa, employs nearly two thousand Tamil coolies on his estate; he keeps a large number of cows, and gratuitously distributes the milk morning and evening, among about one hundred children and sick coolies on the estate, with the result that I rarely meet with this disease among the coolies employed by him. Further, fresh cows' milk is the only suitable article of diet that can be relied on in the treatment of this disease, and without it treatment is inefficacious.

How the Disease is Spread.

In my opinion, adults contract this disease from children. When one considers the small, ill-ventilated room inhabited by one family among the coolies, who sleep together and eat from the same plate or leaf with their fingers, it is not to be wondered at that infection spreads. I have seen on Colloden Estate, Neboda, a Tamil coolie family of five, father, mother, and three children become decimated within a short time after the youngest child contracted the disease. During the current year, on Medatenne Estate, Ramboda, a family of four, father, mother, and two children, have all died six months after the youngest child contracted the disease. The father and youngest child died in the hospital, the mother and daughter on the estate.

Another case will convey to you how easily the contagion can be carried from person to person. The present barber of the hospital began working here about eighteen months ago. He was a healthy-looking boy of 18. He visits the hospital twice a week to attend to the patients. In about fourteen months' time he first complained of night-blindness, and a month later of sore mouth and diarrhœa, and rapid wasting. The barber attributed his illness to the inhaling of the breath of patients suffering from tabes mesenterica whilst shaving them. I did not submit specimens of his urine and sputum to the director of the Bacteriological Institute, as he informed me that he could only detect the tubercular bacillus in extreme cases of general tuberculosis. I carefully enquired into the family history of the barber, and found no taint of tuberculous disease on his father's or mother's side, nor among his brothers or sisters. The conclusion is, that he caught the contagion from the patients afflicted with the disease in the hospital. This man seems to have quite recovered under treatment, and is attending to his duties.

The following interesting facts help to prove the identity of the two diseases through treatment.

(1) Mr. P. W. Basset Smith, Fleet Surgeon, R.N., Lecturer on Tropical Diseases, Haslar, recommends the following treatment, which he has found successful for sprue: The administration of iron and arsenic in very full doses, with ox-gall pills, to supply the absence of normal bile, and prevent fermentation in the bowels. (Vide *British Medical Journal* of September 19th, 1903, p. 641.)

(2) For generations past, a native family in Gampola, called the Korale family, has been making a living by treating the disease called "māndan," or tabes mesenterica. The patient has to provide a fresh liver, preferably of a sheep or goat, with the gall-bladder intact. The Korale's wife prepares a dry curry, by chopping it into pieces with the contents of the gall-bladder and a certain quantity of arsenic and sulphate of iron. When cooked it looks like a Madras curry. The patient has to eat a dessert-spoonful twice a day, morning and evening, as long as the curry lasts, and take a cold bath daily. I certainly have seen more than one patient cured by this treatment.

In conclusion, I submit that after prolonged observation of "tabes mesenterica" and "Ceylon sore mouth" and diarrhœa, that they are identical in symptoms and tubercular in origin.

TRYPANOSOMIASIS IN MAN.

By Guy R. Ruata, M.D.Turin.

Of the London School of Tropical Medicine. *

(*Continued from p.* 149.)

Trypanosomiasis was at one time considered a peculiar kind of malaria, a variety of beri-beri, a form of sunstroke, a consequence of immoderate drinking of palm-wine, or of the smoking of Indian hemp. Corre compared the disease to ergotism and lathyrism; later, considering the frequency of the glandular swellings of the neck, he believed it to be a form of scrofula. Ziemann (1902), continuing the hypothesis of Calmette (1888), compared the disease to pellagra, pointing out that the sweet cassava (*Manihot Aipii*) and the bitter cassava (*Manihot utilissima*), eaten raw, can produce the infection. But there is no relation between the infected area and the cultivation and the use of these plants.

Amongst other causes assigned also were the *Anguillula intestinalis* by Le Dantec, and *Ankylostomum duodenale* by Ferguson. Attention has also been called to the resemblance of sleeping sickness to Wernicke's acute poliencephalitis superior; but the entire epidemiological and clinical condition points to the conclusion that it is a disease *sui generis*.

The best known theory is that of Manson (1891), who, remarking upon the correspondence which seems to obtain in the distribution of this disease and that of *Filaria perstans*, and the long incubation period, suggested that this parasite might be the cause of the lethargy. Following this idea, Osborne Browne suggested the disease be a sort of cerebral elephantiasis, caused by occlusion of the lymphatics leading from the brain, due to a parental form of *Filaria perstans*.

But the recent researches of Low, Christy, Moffat, Cook and Hodges have proved that *Filaria perstans* has nothing to do with sleeping sickness, and that the fact that it is present in many cases of the disease is merely a coincidence.

Filaria perstans was found in 70 per cent. of natives, both men and women, in Uganda and Busaga.

Christy found that *Filaria perstans* was entirely absent even in districts where sleeping sickness was affecting half the population; besides, the area of distribution of *Filaria perstans* extends 150 miles north-west of the area of the disease.

Filaria perstans is very common in British Guiana, but sleeping sickness is unknown.

In 1897 Cazigal and Lepierre, having isolated a bacillus in the blood of a patient suffering from sleeping sickness, claimed they had discovered the cause of the disease, because, when injected into animals, it reproduced the infection; these experiments were not confirmed by Brault and Lapin.

In 1898, Marchoux, at Saint Louis, in Senegal, in a case of sleeping sickness complicated with pericarditis, found the diplococcus of Fränkel at the *post-mortem* examination. As he also found the same coccus in the secretion of the nose in another case of sleeping sickness, complicated by chronic rhinitis, he suggested that Fränkel diplococcus might be the cause of the ailment.

In 1901, Broeden, of Leopoldville, in the Congo, found in the blood and the cerebrospinal fluid, at the *post-mortem* examination, a bacillus, slightly motile, producing a pellicle on bouillon, and growing abundantly on potatoes; it was not agglutinated by the blood of patients suffering from sleeping sickness. As Broeden found the germ in the blood of all his patients, he believed it the cause of the disease.

During the same year, in Angola, a commission was sent by the Portuguese Government to study this disease. Bettencourt and his colleagues state they have found in the cerebrospinal fluid in every *post-mortem* examination, as well as during life, by lumbar puncture, a diplostreptococcus, which was found in the blood also and in the lymphatic glands.

Professor Castellani, sent, together with Drs. Low and Christy, by the Foreign Office and the Royal Society to study the disease in Uganda, in the first period of his researches found frequently a streptococcus (a variety of *Streptococcus pyogenes*) in the blood and the cerebrospinal fluid of patients suffering from sleeping sickness. But he found the germ very rarely during life, and only in the last stages of the disease.

Examining the cerebrospinal fluid obtained by lumbar puncture, he obtained positive results five times on twenty-eight patients, and in four only a few hours before death. The bacteriological examination of the splenic juice and of enlarged lymphatic glands removed during life gave negative results. For these reasons Castellani, thinking that the presence of this coccus was merely a coincidence due to a secondary infection, as occurs in many cryptogenetic infections (*e.g.*, rheumatic polyarthritis, scarlet fever, &c.), prosecuted his investigations.

In November, 1902, having modified the technique for the examination of the cerebrospinal fluid, Castellani discovered a protozoa to be the true cause of the disease.

Castellani's original description is as follows: "By means of lumbar puncture one draws off at least 15 ccm. of the cerebrospinal fluid. It is better to reject the first few ccm., as they are apt to contain blood. When the fluid comes away clear, 10 ccm. are collected and centrifuged for fifteen minutes. At the end of this time there is found at the bottom of the tube a slight deposit of whitish sediment, and in some cases also a minute trace of blood. The liquid above the sediment is poured off, and the sediment examined under a moderately low power of the microscope. As the trypanosomes are at first fairly active, they are easily detected."[1] Castellani demonstrated their presence in 70 per cent. of cases; he found them also twice in the cerebrospinal fluid of the lateral ventricles, and once in the blood.

The only species of trypanosoma so far found in man is *Trypanosoma Nepveui*, called by Dutton *T. gambiense*, and by Manson, *T. hominis*.

The shape and size of the trypanosoma found by Castellani (*Trypanosoma Castellanii*, Kruse) does not differ essentially from those already known. The

[1] Journal of Tropical Medicine, June 1, 1903.

morphological peculiarities are: *Trypanosoma gambiense:* length 24·3 μ, chromatic dots 4; distance of micronucleus from the anterior end, 1·5 μ.

Trypanosoma Castellanii: length 18-26 μ, chromatic dots 20; distance of micronucleus from anterior end, 0·47 μ. The flagellum takes origin apparently from the micronucleus, which is outside the vacuole; this is generally oval and larger than in the other trypanosomes; the free portion of the flagellum is longer. The anterior extremity is more or less rounded or blunted. The *Trypanosoma Castellanii* moves always with the "anterior" end in front, whereas the other known trypanosomes move generally with the flagellum in front (posterior end). The protoplasm does not stain evenly nor very deeply; it also shows some chromatic granules.

Castellani adds that, besides these adult forms, one meets in the blood, as well as in the cerebrospinal fluid, with other rare forms with different shapes, in which the primitive shape is quite altered; the parasite becomes thickened and squat; the vacuole may assume greater dimensions, the chromatin may collect round the nucleus, the protoplasm staining less pronouncedly. Very likely these forms represent stages of preparation for division, as in the case of *Trypanosoma Lewisi,* observed by Laveran and Mesnil.

Besides, Castellani, in both the blood and the cerebrospinal fluid, observed several times large rounded bodies of 10-14 μ in diameter, possessing very finely granular protoplasm, with one or more vacuoles. These bodies may very slowly change their shape from a rounded to an ovoid form. If stained by the Leishmann-Romanowsky method, they show two or more points where the chromatin collects, and sometimes very fine flagella. Rabinowitch and Kempner described similar bodies in *Trypanosoma Lewisi.* Castellani thinks they are developmental stages. Döflein considers the Rabinowitch-Kempner bodies of *Trypanosoma Lewisi* probably stages of sexual reproduction.

Castellani found also in the cerebrospinal fluid some pear-shaped forms, 5 to 7 μ in diameter, with macronucleus and micronucleus present; round these is an unstained portion like a vacuole; at the sharper extremity they have frequently a fine short flagellum, which apparently takes origin from the centrosome; something like the *amœboid forms* described by Plimmer and Bradford in *Trypanosoma Brucei.*

Up to the present date the examination of tissues for trypanosomes has proved negative. Castellani thinks that smears of the tissues might give better results.

In conclusion, although the morphology of Castellani's trypanosoma may now not be definitive, we can distinguish typical adult forms, atypical adult forms, forms in different stages of multiplication, Rabinowitch-Kempner bodies, and Plimmer-Bradford bodies.

Is Trypanosoma Castellanii a New Species?

A question now arises: Is *Trypanosoma Castellanii* a different biologic species from the trypanosomes previously found in man? Several examples of parasitism in fish as well as in mammals clearly suggest to us that different species of the genus *Trypanosoma* may infest the same host, *e.g., Trypanosoma Evansi,* the cause of surra, *Trypanosoma Brucei,* the cause of nagana, *Trypanosoma Equiperdum,* the cause of dourine, are found in horses.

I think that *Trypanosoma Castellanii* may be a new species.

The connection between *Trypanosoma Castellanii* and sleeping sickness has now been proved by the experiments of Colonel Bruce, R.A.M.C., who, in 1903, continued the investigations in Uganda, following the method originally employed by Castellani, who fully explained his discovery and the methods he adopted to Bruce before he (Castellani) left Uganda for England.

Bruce, having examined the blood of patients suffering from the so-called trypanosomiasis fever, keeping them under clinical observation during many months, and the case examined by Manson, justifies the important conclusion that the trypanosomiasis fever is the first stage of sleeping sickness.

In truth, no difference can be made out microscopically between the trypanosomes found in both of them. Many of Bruce's experiments show that the trypanosomes derived from the cerebrospinal fluid of cases of sleeping sickness, and the trypanosomes derived from the blood of persons showing no symptoms of the disease can both give rise to a chronic and fatal disease in monkeys, bearing a striking resemblance in its last stages to sleeping sickness in man.

In order to know if the blood of the general population does contain trypanosomes, Bruce and his colleagues, Drs. Nabarro and Grieg, examined the blood of 117 people from districts where sleeping sickness was unknown, but they could not find a single trypanosoma.

Subcutaneous injections of human blood containing trypanosomes into the donkey, ox, guinea-pig, dog, pup, goat and sheep, were not followed by the appearance of trypanosoma in the blood.

(*To be continued.*)

The Dufferin Fund in India.—The Central Committee of the Dufferin Fund in India has just issued their report for 1903. This is the nineteenth year of the existence of the fund, and good work continues to be done throughout a wide district. Under the auspices of the fund there are 41 lady doctors, 78 assistant surgeons, and 256 hospital attendants holding appointments in India. At the commencement of 1904 there were 114 ladies (European and Indian), being trained as assistant surgeons, 95 hospital assistants, and 281 as nurses, dais, and compounders. Under the direction of the Victoria Memorial Scholarship Fund, a movement initiated by Lady Curzon, there are 194 dais being trained.

No fewer than 1,792,000 women and children were treated in Zenana hospitals, wards and dispensaries by female agency throughout the country.

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THE

Journal of Tropical Medicine

June 1, 1904.

THE DISEASES WHICH THREATEN THE ARMIES IN MANCHURIA.

We hear from time to time vague rumours about the loss of life from disease in the armies of Russia and Japan in Manchuria. Now it is beri-beri which is said to prevail, then dysentery is declared to be prevalent, and typhus, typhoid, cholera, plague, and even sleeping sickness, have each and all been said to be sweeping off large numbers of the soldiers. We believe that disease does claim its victims in either army, but we have no official notification, nor even the report of any expert onlooker, to help us towards a conclusion of the nature of the malady or maladies which prevail. No doubt the medical men of both armies will in time issue full reports, which, if they are made public, will prove of interest to the student of public health and of military history. In the meantime it is impossible to do more than guess what is happening, and we are dependent upon reports the value of which may be judged by the statement that "beri-beri, *i.e.* (*sic*) sleeping-sickness," is decimating the armies. To take any of these reports seriously is, of course, impossible; for the epidemic diseases, if there are any, afflicting either army are unknown except to medical officers at the front. We may discount, however, the presence of beri-beri whilst the armies are moving in either attack or retreat. Beri-beri is a "place" disease, and occurs amongst soldiers stationary in barracks, but not during an active campaign. Plague is, again, a disease which is not calculated to attack a quickly-moving army. The one way to get rid of plague is to camp out, and away from the focus of infection, and, should the disease reappear, to again strike camp and proceed further afield. For beri-beri and plague, therefore, active campaigning is a decided prophylactic. Typhus fever is another ailment foreign to armies on the march, and even cholera is less likely to prevail amongst troops quitting quarters rapidly than when they are hemmed within a beleaguered city, or cooped up in barracks within an infected area.

Presently the rainy season will visit districts in which the war is being conducted, and the troops will be more or less stationary in a water-logged soil. The wise general will transfer his troops to high ground when that is possible, and change camp frequently. The flat, dreary stretches of Manchuria, however, present but few opportunities of this sanitary measure being carried out. Manchurian cities are insanitary to a degree, and the mud walls of the houses become slimy without and covered with fungi within. The mud floor becomes wet and foul, and were it not for the "kang" there would be no dry patch to lie down upon. The kang, or stove, is built for purposes of warmth during the winter. The apartment in which the family practically live is occupied usually for some two-thirds of its area by the kang—a platform built of clay and brick and raised some two to three feet from the level of the floor. The kang is warmed by a fire underneath, and upon its flat surface the family sleep during the night and squat in wintry weather during the daytime.

Condemned to quarter in such abodes during either the summer when the country is a swamp, or during the intense cold of a Manchurian winter, diseases such as typhus and cholera—for cholera attacks persons dwelling in such environment in winter—are certain to appear. Although disease may be prevalent in the armies in Manchuria at the present moment in some degree, the danger will be increased to a manifold extent when, by the exigencies of the weather, the troops are compelled to desist from active campaigning. The sanitary prophylaxis accruing to changing camp will be lost, and the evils of overcrowding during inclement weather will threaten the efficiency, if not the very existence, of any army which fails to provide against its evil consequences. During a prolonged campaign dysentery and typhoid in summer, and in addition typhus in winter, are the endemic diseases to be dreaded and provided against in Manchuria, and the future efficiency of either army will largely depend upon the provisions made to counteract these scourges.

SIR FRANCIS LOVELL'S MISSION TO THE EAST.

On February 9th, 1903, Sir Francis Lovell, C.M.G., proceeded to the East in order to further the interests of the London School of Tropical Medicine, of which school he is the Dean. Sir Francis first went to Burmah, where he was fortunate enough to secure the valuable assistance of Lieut.-Colonel Dantra, M.D., I.M.S. Considerable interest in the School was aroused locally in Rangoon, and Colonel Dantra was appointed the representative of the School in that city. In Singapore, Sir Francis found several of the leading Chinese ready to advance the interests of the School by substantial contributions, amongst others being the Honourable Dr. Lim Boon Keng, the Honourable Seah Leang Seah, and the Honourable Tian Jack Kim.

At a meeting of the Branch of the British Medical Association in Singapore, under the presidency of Dr. Kirk, Sir Francis brought to the notice of the meeting the work done by the London School of Tropical Medicine, and a Committee of the Branch was nominated to meet from time to time. Dr. McDowell, C.M.G., Principal Civil Medical Officer of the Straits Settlements, was nominated local representative of the School.

At Kuala Lumpur, in the Federated Malay States, Sir Francis Lovell obtained cordial assistance from Dr. Daniels, the Director of the Institute for Medical Research at Kuala Lumpur. Dr. Daniels was formerly Superintendent and Medical Tutor at the London School of Tropical Medicine, and the Institution over which he at present presides is affiliated with the School.

By Dr. Daniels' active assistance several meetings of the community were held, at which Sir Francis gave an account of the School and the important work it is accomplishing. He found his audience sympathetic, and obtained several contributions towards the funds of the School.

We congratulate Sir Francis upon the success of his mission, and we are glad to know that his health, which caused him to postpone the original date of his departure from London, is now re-established.

THE LONDON SCHOOL OF TROPICAL MEDICINE.

Fifteenth Session, May—July, 1904.

The following students have entered for the three months' course :—

J. C. M. Bailey, M.B., M.R.C.S., L.R.C.P.

J. D. Bate, L.S.A. (Colonial Service).

R. H. Brembridge, M.A., M.B., B.Ch., B.Sc., M.R.C.S., L.R.C.P.

D. Bridges, M.R.C.S., L.R.C.P. (Colonial Service).

A. G. Christian, M.B., Ch.B. (Colonial Service).

R. A. Cleveland, M.R.C.S., L.R.C.P. (Colonial Service).

John Currie, M.D., M.B., M.R.C.S., L.R.C.P. (Colonial Service).

Echeverria, Emilio, M.D. (Columbia).

Fernandez, Mauro, M.D. (U.S.A.).

W. Fisher, M.R.C.S., L.R.C.P. (Rhodesian Mission).

H. W. Garden, M.B., Ch.B.

P. N. Gerrard, M.D., B.A., B.Ch., B.A.O. (Colonial Service).

F. S. Harper, M.B., C.M. (Colonial Service).

Lt.-Col. H. Hendley, M.D., D.P.H., M.R.C.S., L.S.A. (Indian Medical Service).

A. D. P. Hodges, M.D., M.R.C.S., L.R.C.P. (Foreign Office).

C. R. Howard, M.R.C.S., L.R.C.P. (Universities Mission).

Luis P. Jimenez, M.D. (Philadelphia).

A. King, M.B., Ch.B., D.P.H. (Colonial Service).

Miss E. M. Lea-Wilson, L.R.C.P. & S. (Zenana Bible and Medical Mission).

E. E. Maples, M.B., M.R.C.S., L.R.C.P. (Colonial Service).

A. J. Milne, M.B., Ch.B., D.P.H.

T. D. Moffat, M.B., C.M. (Colonial Service).

G. B. Norman, M.B., B.C. (Colonial Service).

J. H. Paterson, M.B., C.M. (Colonial Service).

C. A. Suvoong, M.A., M.B., Ch.B., D.P.H.

Teppati, Temistocle, M.D. (Rome).

Terni, Camillo, M.D. (Milan).

Major F. W. Thomson, M.B., C.M., D.P.H.

Thomas Walcot, M.D., M.R.C.S.

R. O. White, L.R.C.S.I. (Colonial Service).

Several others are expected to join the School within the next few days.

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By Fritz Schaudinn (Rovigno).

(*Translated from the German by P. Falcke.*)

It is a well-known fact that recent investigations on the hæmosporidia, by which were established the changes appertaining to generation and host in the malaria parasites of man, commenced with the examination of the blood parasites of birds. MacCallum's work on "*Halteridium*" and Ross's work on "*Proteosoma*," marked the commencement of the new era in the investigation of malaria. Of the unicellular blood parasites the genus *Plasmodium*, amongst which I include the *proteosoma* of birds, has probably been most closely studied, both in regard to their morphology and physiology, as well as their cycle of development. The most important steps in the cycle of generation of these parasites are well known to us, but a complete knowledge of their entire life history is still wanting. From what we know, however, we are encouraged to study other more or less nearly related blood parasites, our knowledge of which is restricted. The study of various hæmosporidia belonging to the genera *Hæmoproteus* (= Halteridium), *Trypanosoma*, *Piroplasma*, *Karyolysus*, the *Leucocytozœ*, *Spirilla*, &c., should be pursued so that they may be used for purposes of comparison with the better known species of the genus *Plasmodium*. For this reason I have for years studied not only the parasites of mammals, but also those of birds and cold-blooded animals, and I thus hope to be gradually able, with the assistance of my collaborators, to obtain an insight into the variations in the development of the hæmosporidia.

From a practical point of view the genus *Trypanosoma*, next to the genus *Plasmodium*, is the most important blood parasite in regard to man, as we know that some members of this group play an important part in causing disease, both in man and domestic animals. Birds are the most suitable animal for experimental purposes, and we have as a basis to start from the observations compiled and described by Danilewsky in his "*Parasitologie compareé du sang I., Kharkoff*, 1899." My investigations will show that Danilewsky, and after him his follower, Sacharoff, have correctly observed many stages of development of the trypanosoma of the closely-related spirilla, as they are met with in the blood of birds.

H. Ziemann, in his monograph entitled "*Uber Malaria und andere Blutparasiten nebst Anhang. Eine wirksame Methode der Chromatin und Blutfärbung*," Jena: Gustav Fischer, 1895, discovered and minutely studied one of the forms of these so-called leucocytozoa in the little owl, and his investigations, made in ignorance of Danilewsky's work, completed and proved Danilewsky's and Sacharoff's researches, particularly as regards the condition of the nucleus.

The material for the experimental investigation of the alternation of generations of trypanosoma and spirilla consisted of a large number of little owls (*Athene noctua*), which were caught, partly in Rovigno and partly they were provided by bird dealers. For purposes of comparison a number of other birds were examined, partly in Berlin and partly in Rovigno. The following observations only relate to the parasites of the owls.

In the blood of *Athene noctua* there are frequently found, in addition to proteosoma (the development of which in *Culex pipiens* takes place in the same way as those of the sparrow), halteridium and the leucocytozoa discovered by Danilewsky and minutely described by Ziemann. I shall not refer to proteosoma in this communication. I have been able to prove that the halteridium is the sexual stage of a trypanosoma which multiplies in the common mosquito—*Culex pipiens*; and after a complicated migration through the body of the mosquito, is again introduced by its bite into the blood of the owl, where, after a period of sexual multiplication, it is transformed into the well-known male and female halteridium. The halteridium of the little owl was described by Celli and San Felice[1] in 1891 as a particular species under the term Hæmoproteus noctuæ; and as it is only a stage of a trypanosoma the species must bear the name due to priority, *Trypanosoma noctuœ* (Celli and San Felice). It is only further investigation that will teach us if this will hold good for all members of the hæmaproteus, which were formerly termed halterdium. The so-called leucocytozoon of the little owl has been recently recognised by Laveran as a real hæmamœba[2] (hæmamœba being synonymous with plasmodium), and has given it the specific name of *Hœmamœba Ziemanni*. My researches have shown that this form also is transmitted by *Culex pipiens*.

The fertilisation, as in halteridium, takes place in the intestine of the mosquito, the giant ookinet rounds itself off and by a sexual process in the intestine of the mosquito produces an enormous number of trypanosoma-like buds which transform themselves into spirochætæ. The spirilla, which are thus not bacteria, but flagellata, wander into the malpighian tubes and here multiply, in the manner characteristic of the spirochætæ and trypanosomes, by longitudinal fission.[3]

After having flooded this organ they attain the lacunoma and thence reach the most anterior part of the œsophagus, where by means of the bite they are inoculated into the blood of the first host, the owl. After an asexual period of multiplication in the blood, in the form of spirilla, the large gametes are produced. In addition to this direct path through the body of the mosquito, the spirochætæ as well as the halteridium, trypansomes may, under certain conditions, reach the ovaries of the mosquito and there induce an infection

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[1] Compare Celli and San Felice. "*Ueber die Parasiten des roten Blutkörperchens im Menschen und in Tieren.*" In *Fortschritte der Medizen*, 1891, Nos. 12-14.

[2] He therefore concludes that this form appears in male and female gametes which, when the blood cools, carry out fertilisation in the same manner as the members of the genera *Plasmodium* and *Halteridium*. Compare Laveran in *C. R. Soc. Biol.*, 1903, vol. lv., p. 620.

[3] In the spring of 1902 I had already reported my observations on the transformations of these leucocytozoa into trypanosomes to Dr. Ziemann, in Berlin, and he consequently, in a preliminary communication, had termed these forms trypanosomes. *Archiv. fur Schiffs und Tropen hyg.*, 1902, vol. vi., p. 389.

of the next generation of mosquitoes. The leucocytozoa of the owl must, therefore, according to the laws of zoological nomenclature, bear the name of *Spirochæte Ziemanni* (Laveran).

In this preliminary communication I can give neither the exceedingly interesting cytological details of this parasite nor the literature, but can only give a short review of the history of the development in the form of a cycle of propagation.

The methods of investigation used by me in my former studies of rhizopoda and sporozoa were mostly applied in these researches also. The culture of the mosquitoes, the manner of infection, the examination of the blood, &c., were undertaken in the same manner as in my investigations upon malaria.

I.—The Developmental Cycle of Trypanosoma Noctuæ (Celli and San Felice).

The female and male stages of *Halteridium* in the blood of the owl correspond in their morphology, except as regards slight specific differences, to those of the record investigations made by MacCallum on the crow and other birds.

These stages reach the mid-gut (stomach) of *Culex pipiens* by means of the bite, and here go through fertilisation in a manner similar to that described by MacCallum from observations under the cover-glass, that is to say, the pale microgametocytes, which are distinguished by coarse pigment, produce the microgametes, one of which penetrates into one of the darker macrogametes provided with finer pigment. The macrogamete is then transformed into the ookinet. Thus far the development of *Halteridium* was already known. I therefore may commence the description of the cycle of development with the wormlike, motile stage of the ookinet in the intestine of the mosquito. The hyaline and somewhat more light-refracting anterior part of the little worm, during its movements in the disintegrating blood in the intestine of the mosquito, undergoes many changes of form, being sometimes quite pointed, sometimes rounded off obtusely. Behind this anterior portion there is a zone containing one or several large or small light vacuoles; the closer plasm with the nucleus then follows, and finally there is the more or less obtusely rounded posterior extremity with the pigment. The movements of the ookinet are the same as those observed in the malaria parasites, *i.e.*, curved movements, peristaltic contractions and a gliding forward with the assistance of a slime-like secretion, as in the gregarines. In this condition the parasites are found, according to the surrounding temperature, eight to thirty-six hours after the sucking of the blood. It is known that a short time after the inbibition the more solid constituents of the blood separate from the liquid constituents. In the intestine of the mosquito the former occupy the posterior three-quarters, the latter the anterior quarter, of the midgut. The ookinets, which, during the first hours after the sucking were distributed fairly evenly throughout the blood, gradually collect into the antorior part of the midgut containing the liquid constituents of the food. During their migration through the food mass they undergo a series of changes, which consist, first of all, in getting rid of the superfluous ballast of the excreta, particularly the granule of pigment. These become enveloped in slimy masses of plasm, which, during the migrations, are thrown out at the posterior end; at the same time the reduction nucleus, which had remained after fertilisation, is also removed. Later on I shall again refer to this process. During this period, also, there takes place the slowly progressive blending of the male and female parts of the nucleus with the synkaryon. Though I can only refer shortly to the details of the fertilisation, I may mention the following to elucidate the matter: My investigations of the various complicated alterations of the nucleus of this parasite have demonstrated that the nucleus or nuclei exhibit a certain number of chromatic elements or chromosomes, eight being the normal number. Before fertilisation the normal number of the chromosomes is reduced from eight to four in both series by means of a succession of complicated ripening processes, by means of the formation of groups of four, which are then divided up by reduction divisions. We find, then, that in the newly-formed ookinets there are two groups of four chromosomes close to each other, and these together form an equal number of sporozoa of the spindles of fertilisation already described.

Next to these spindles there lies a complicated form to which I will first of all give the general name of karyosom without expressing any homology. This, at a certain stage, possesses besides a central granule surrounded by a light area also and chromatin forms which formed into a globular body, contains a coloured plastin-like substance. This karyosom moves on into the granular spindle which is rounding itself off and finally occupies the centre of the synkaryon, which has become globular. I consider this stage of the ookinets, which is schematically represented in fig. 1*a*, as the point of departure for the description of the cycle of development. A comparative study of the ookinets in this stage shows that this scheme of the configuration of the nucleus takes place in all of them, but that other peculiarities of the structure of the plasm and the proportion of the mass thereof to the nucleus are very variable. We find large ookinets with a relatively small nucleus, and small ookinets with a large nucleus. We find the plasma more or less copiously laden with reserve materials, and so on. This variability may be caused by various factors, for the fate, which the cells that have reached maturity have undergone, are of various kinds in physiological as well as in ontological respects. There are males and females more or less well nourished; according to their origin one may be old, the other young; they may have originated, some asexually by simple fission, others by means of parthenogenesis; in short, I am convinced that the cause of the variability of the germinal cells, and therewith the differentiation of the sexes in these seemingly simple organisms, are represented by the combination of factors as complicated and manifold as is the case in the highest organisms.

The attempt to evolve a more simple description of their life history is beset by difficulties as great as we meet with in the metazoa. In any case, the study of the morphology and history of development will not solve the problem. It appears to me very questionable if experimental physiology in this field will

bring us any further. I can therefore here only describe facts without going into causes. These show that the ookinets are sexually differentiated even from their commencement. They develop in three ways, as indecisive hermaphrodite forms, or as pronounced male or female entities. The hermaphrodite forms, under certain conditions, may also, again, become males or females, but unfortunately the causes for this change are unknown. The three series of forms may multiply asexually, the indecisive ones by dividing into two. All the females can, again, reproduce the three series of forms through parthenogenesis, whereas the males have the most limited powers of development. They increase in a multiple manner and are then, however, capable of fecundation, and if they do not copulate with females they perish. Under certain conditions, however, and in the indecisive forms as well as in the females, there seems to be a limit to propagation in the mosquito as well as in the bird. These conditions, again, demonstrate an exceedingly complicated set of factors. Causes resident in the parasites themselves, as well as environment, in this case vested in the host (antibody, &c.), may all tend to limit the multiplication of the parasites. The study of the morphology and history of development can thus only lay the foundation for further physiological research, and can contribute but little to complete elucidation. After these remarks, I will give a brief review of my results, though these also leave many questions unanswered.

In this preliminary communication I find I must mostly limit myself to indications which may serve the purpose of urging new collaborators to investigate this subject, which is important, not only to parasitology, but also for the united study of cells of important organisms.

(*a*) The Origin of the Indecisive Trypanosomes from the Ookinets.

We start from the stage of the ookinets sketched in fig. 1*a*. Its plasma is light in colour and does not easily stain. The complete synkaryon lies in the centre, and in addition eight chromosomes are often distinguishable, and these surround the dark stainable karyosom. The structure of the latter has been previously described. Eight chromatin elements are occasionally also recognised in it, and these surround a central granule. The pigment and four nucleus-like forms, the residue of the processes of reduction, lie in the posterior rounded half of the ookinet. Fig. 1*b* shows an ookinet that is in the act of getting rid of the pigment and the residual body. The nucleus now undergoes a series of alterations which gradually lead to the formation of a heteropole spindle. First of all one observes on the living object that the karyosom carries out amœboid movements and gradually becomes less light refracting. It gives one the impression of its delivering substances to the periphery from the central part of the nucleus. In my book I describe minutely this mixing of the peripheral portion of the karyosom with the chromatic element by aid of a large number of coloured illustrations.

Certain modifications of Romanowsky's method

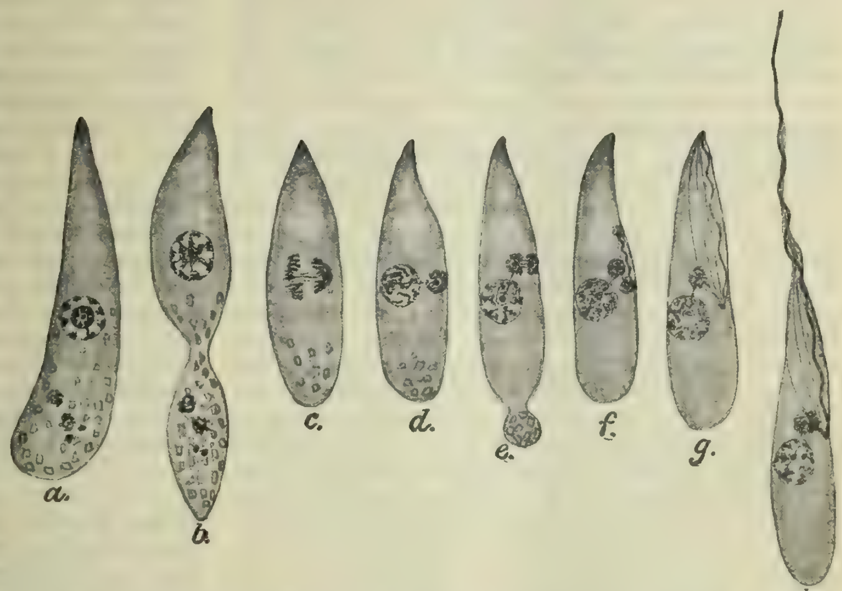

Fig. 1.—*a*-*h*, Schematic illustration of the transformation of an ookinet of an indifferent character into the trypanosoma stage.

succeed in staining the karyosom in a shade of colour different to that of the rest of the nucleus, and thus permits its transformation to be traced. The result of these processes is that eight chromatin elements of the karyosom are united with eight peripheral chromatin complex bodies by the assistance of the plastin. Only the central granule with its light area remains in the centre of the nucleus. The central granule divides dumb-bell like, and a small, central spindle forms in the nucleus; round this the eight complicatedly structured chromosomes are grouped in the equator. The chromosomes split up and divide from each other to the diaster stage. This is illustrated in fig. 1*c*. A distinct heteropole of the spindle is observed, the right half of the spindle is distinctly smaller, and in the stained specimen appears darker, and is richer in plastin. In this manner two nuclei are formed of different size and structure. In fig. 1*d* the left daughter nucleus is already in the act of reconstruction. The eight chromosomes have become long meandering twisted filaments. The right nucleus is much smaller and closer; it is mostly only possible to count the eight chromosomes in it in favourable maceration preparations. Every nucleus contains a central granule in the centre, which is connected with the sister nucleus by means of a fine achromatic filament, and seems to be connected even further. At all events, I have been able to trace it still further in much later stages by means of staining. The small

nucleus is, in addition, richer in plastin; it may be stained to a violet hue, according to Giemsa, while the left nucleus remains pure red. In the living specimen the entire process of division of the karyosom and the nucleus takes place so quickly, that before I had studied the stained specimens and received the following impression I saw that the karyosom became amœboidly motile and gradually disappeared. It suddenly seemed to pop up again at the right side of the nucleus and to move out of the nucleus with lightning-like rapidity, the entire process occupying but a few minutes. In reality, however, the karyosom that pops up anew was the right half of the spindle which was much more light refracting than the larger left half. After having minutely studied the stained preparations I was able to see much more in the living creature.

This case has led me to the conviction that the study of living and stained specimens should be combined, and one should control the other. I was obliged to go through a similar experience in observing the further transformation of the ookinet to the flagellate. Thus I believe I was the first to confirm the fact that the karyosom moves out of the nucleus to the anterior right lateral wall of the somewhat flat ookinets. I then saw that a serpentine filament grew from this karyosom along the right border, I saw that this thread extended still further towards the front, and finally appeared as a free flagellum far beyond the point of the ookinet, that it soon commenced to make undulating movements, which moved the ookinet, now a trypanosoma, out of the centre of the field. I gained the impression, which appears to coincide with all that is known, that the karyosom which, according to Laveran and Mesnil, was homologous with the centrosome, moves out of the nucleus, becomes a blepharoplast, and produces the support of the undulating membrane, the free end of which represents the flagellum of the trypanosoma. The study of the preparations, more particularly of stained preparations, however, showed that in this case, also, I had only seen the rough outline, certainly only the frame of the actual picture which proved to be far more complicated, and may be more complicated indeed than I could prove, even with the aid of the best optical and technical instruments.

(*To be continued*).

Review.

Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India: A Preliminary Report on a Parasite found in Persons Suffering from Enlargement of the Spleen in India. By Lieutenant S. R. Christopher, M.B. Vict., I.M.S. New Series, No. 8, Calcutta: Office of the Superintendent of Government Printing, India, 1904, pp. 17. Price 1 Rupee, 8 annas.

This extremely interesting report by Lieutenant S. R. Christopher, I.M.S., details the results of his researches on the nature of a parasite found in enlarged spleen in India. The Government of India deputed him to proceed to Madras and investigate the nature of the parasites that had been found there by another officer of the India Medical Service, Captain Donovan. There had been previously much discussion as to their nature. In 1900 Major Leishman, R.A.M.C., discovered these parasites in a fatal case of fever contracted in Dum-Dum. He constantly found chromatin masses in them, and suggested that the bodies in question might be the remains of trypanosomata, and that, like cases of malarial fever, were in reality cases of trypanosomiasis. In 1903, Captain Donovan found the same bodies taken during life by splenic puncture. This observer considered them to be a new form of parasite, as he failed to find trypanosomata in the blood. Specimens were transmitted to Major Ross, Professor Laveran and Professor Mesnil. Ross held them to be a new form of parasite, and suggested the name of *Leishmania Donovani*. Next Professor Marchand and Dr. Ledingham found similar organisms in the spleen, liver and bone marrow. Laveran and Mesnil concluded the parasite belonged to the piroplasmata, and named it the *Piroplasma Donovani*. The above report gives us the clinical details of cases, narrates its relation to kala-azar, sets forth a description, and the distribution of the organism in the body, and gives an account of a new method of staining sections by a modification of the Romanowsky stain; the author compares the parasites with a species of piroplasma, and draws attention to the nature of the so-called "zooglea mass." The clinical features are well portrayed, as are also the *post-mortem* appearances. The author could not trace much relationship to kala-azar, as there was no increase in pigmentation. A concise description of the parasites is next given, with its distribution. As the result of his inquiry Lieutenant Christopher shows that there is only a superficial resemblance to the piroplasmata, and that the difference between the two forms is extremely great. He suggests that they are the spores of a micro-spirillum. The work contains some very clear plates illustrating the subject. Lieutenant Christopher is to be congratulated on the excellence of this report.

Notes and News.

According to Dr. Dempwolff, a member of the malaria expedition to Hubertshöhe, New Guinea, a water insect (*Notonecta*) has been found in New Guinea inland waters which destroys mosquito larvæ.

Colonial Congress in Paris.—The Colonial Congress of General Hygiene and International Prophylaxis holds its meetings in Paris from May 29th to June 6th, under the presidency of Professor A. Charrin. Professor Brault is the Vice-president of the Congress, and Ali Zaky Secretary of the Committee d'Islam.

Eugenics is defined by Francis Galton, F.R.S., to be the science which deals with all influences that im-

prove the inborn qualities of a race. The syllable "eu" signifies "good," and the aim of Eugenics is to bring as many influences as can be reasonably employed to induce the useful classes in the community to contribute *more* than their proportion to the next generation.

An observation, attributed to Dr. Schoo, is to the effect that so long as mosquitoes feed on acid fruits they are not readily infected by malaria parasites. This is in accordance with Professor Celli's statement, that in districts where the tomato is cultivated malaria is rare. The immunity is considered to be due to the vegetable acids of the tomato proving inimical to the development of the malaria parasite in the stomach of the mosquito.

We regret to record the death at Nauheim on May 19th of Mr. Jamsetjee Nusserwangi Tata, of Bombay, who has during his life of 65 years done so much towards improving the industrial expansion of India, and by his philanthropy contributed so largely to the educational opportunities of natives of India. The Indian University of Research to be instituted at Bangalore, towards the endowment of which he offered no less than £200,000, will remain as a monument of munificent liberality of this extraordinary man.

The Philippines.—During the month of January, 1904, the more important causes of deaths occurring in the population of the city of Manila, with the number of deaths, were as follows: Convulsions of children, 272; pulmonary tuberculosis, 78; eclampsia, non-puerperal, 47; chronic bronchitis, 46; congenital debility, 40; acute bronchitis, 34; diarrhœa and enteritis, 31; meningitis, 25; beri-beri, 25; dysentery, 18; malarial fevers, 13; endocarditis, acute, 12; pneumonia, 11; Bright's disease, 8; bubonic plague, 7; cerebral hæmorrhage, 6; puerperal septicæmia, 5; typhoid fever, 5; Asiatic cholera, 3; tetanus, 4; leprosy, 3.

Of the above-mentioned causes and deaths the following occurred in infants prior to the completion of the first year of life: Convulsions of children, 272; eclampsia, non-puerperal, 47; chronic bronchitis, 32; congenital debility, 40; acute bronchitis, 32; diarrhœa and enteritis, 24; meningitis, 15; dysentery, 1; pneumonia, 1; tetanus, 4. Of the 796 deaths occurring among inhabitants of the city, 475, or 59·6 per cent., occurred in children less than 12 months of age.

According to J. M. Banister, *Journ. Amer. Med. Assoc.*, April 30th, 1904, the prognosis of operations in the Philippines is practically as good as in temperate climates.

We regret to announce the death from plague in India of Miss Harriet Winscom, a most accomplished and efficient nurse. Miss Winscom has been devoting herself to work in plague hospitals in the Bombay Presidency for several years, and her death is widely and deeply regretted. The funeral took place at Suvre on April 12th.

Young Japanese Tea as a Cause of Uterine Symptoms. *Bulletin medical*, xviii., *Fortchritte der medizin*, 1904, April 10th.—According to Lortut-Jacob and Sabareanu, three women drank tea, made from young tea leaves grown in the host's garden, and developed severe uterine troubles. One woman, who was menstruating was seized with pains like labour pains, and suffered from vertigo and dyspnœa. Another, who had ceased menstruating twenty-four hours, had a copious recurrence of the period; and a third, in the fifth month of pregnancy, had uterine pains and discharge of liquor amnii. [Surely some extraneous toxicological agent had been imbibed with the tea.—Ed. J. T. M.]

Two British nurses, Miss McCaull and Miss Elaine St. Aubyn, have gone to Japan to study and report upon Japanese methods of nursing the wounded.

The Russian surgeons are supplied with sterilised rubber gloves for use on the field of battle.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Cultivation of Trypanosoma Evansi.

Novy, F. G., McNeal, W. J. and Hare, C. B. On the Cultivation of *Trypanosoma Evansi*, a paper read on May 11th, 1904, at the Meeting of the Association of American Physicians, *Medical Record*, 1904, May 14th.—The authors show that the trypanosome met with in the surra of the Philippines, differs from that found in the nagana of South Africa. The surra trypanosoma of the Philippines can be cultivated artificially, and can be obtained in an attenuated form. By these characteristics it is distinguishable from *Trypanosoma Lewisi* (rat trypanosome) and *Trypanosoma Brucei* (nagana, a South African trypanosome).

Laveran and Mesnil have already shown that the surra of Mauritius and the nagana of South Africa are not identical.

Novy and McNeal stated that the presence in cultures of *Trypanosoma Lewisi* of motile minute forms 2 to 5 μ in length, suggested the possibility of the organism passing through a Berkefeld filter. Experiments in the same direction with *Trypanosoma Brucei* gave negative results. It appeared to the authors that, under certain conditions, large organisms may give rise to a minute stage of the organism capable of passing through a filter.

Plague.

Dr. Pearse, Acting Medical Officer of Health in Hong Kong, in the Annual Report for 1903, states that the proved infection of rats coincided fairly regularly in its rise and fall with the increase and diminution of cases of plague in human beings in the

Colony. The epidemic affected the rats somewhat earlier and stayed a little longer amongst human beings.

The annual report on the Health and Sanitary Condition of Hong Kong, by J. M. Atkinson, M.D., Principal Civil Medical Officer for 1903, issued on March 13th, states that: During 1903 there were 1,415 cases of plague notified against 460 in 1902. The disease showed a marked decline when the minimum temperature reached 82° F. The minimum number of cases of plague occurred in December, when but 2 were recorded, and the maximum occurred in May, when 515 were reported. The treatment by 12-grain doses of carbolic acid, administered every two hours, still recommends itself to the medical officers in Hong Kong, and appears to afford encouraging results. Of 101,056 rats examined, 3,744 were found infected with plague; the prevalence of the disease in human beings and in rats increased and declined coincidently. It is the intention of Dr. Hunter, the Medical Officer of Health, to make Haffkine's prophylatic serum in Hong Kong to prevent the risk of contamination during the voyage from India.

Prevalence of Plague.

India.—During the weeks ending April 23rd and April 30th, the deaths from plague in India numbered 38,748 and 44,783 respectively.

Cape Colony.—Port Elizabeth: During the weeks ending April 30th and May 7th, the fresh cases numbered 1 and 0 respectively; there were no deaths. No plague in other parts of Cape Colony.

Transvaal.—During the weeks ending May 14th and 21st, the fresh cases of plague numbered 7 and 14, and the deaths from the disease 2 and 2 respectively.

Hong Kong.—During the weeks ending May 17th and 26th, the fresh cases of plague amounted to 28 and 39, and the deaths from the disease to 27 and 35 respectively.

Mauritius.—Three fatal cases of plague occurred during the week ending May 26th. No cases during the previous week.

Sleeping Sickness.

Greig, E. D. W., Capt. I.M.S., and Gray, A. C. H., Lieut. R.A.M.C. Note on the Lymphatic Glands in Sleeping Sickness. Communicated by Col. Bruce, F.R.S., at the desire of the Sleeping Sickness Commission. Received and read May 5, 1904. Forwarded for publication by the Royal Society.

Captain Greig, in a letter dated March 17, 1904, writes that, following a suggestion of Dr. Mott, they have examined the contents of lymphatic glands during life from fifteen sleeping-sickness patients. In all of them actively motile trypanosomes were very readily found in cover-glass preparations taken from the cervical glands. They were also present in other glands, such as the femoral, but were not nearly so numerous.

They found the trypanosomes to be far more numerous in the glands than in the blood or cerebrospinal fluid, and believe that the examination of fluid removed from lymphatic glands will prove to be a much more rapid and satisfactory method of diagnosing early cases of sleeping sickness than the examination of the blood.

At first the glands were excised, but this was soon found to be unnecessary, as it is easy to puncture a superficial gland with a hypodermic syringe and suck up some of the juice into the needle and blow this out on a slide. The actively moving trypanosomes were readily found after a short search in these slides, when a prolonged search in similar preparations of the blood from the finger failed to discover them. In stained specimens, in addition to well-formed trypanosomes, there exist many broken-down remains which suggest that a destruction of the trypanosomes takes place in the glands.

The authors also examined the cervical lymphatic glands of the five natives suffering from trypanosomiasis who have been under observation for the past year, and found actively motile trypanosomes in the liquid withdrawn from the glands in all of them. Tabula, one of these patients, is employed in the hospital, and the dispenser reports he is getting very stupid.

The lymphatic glands were also examined for streptococci by staining and culture, but in every case were found to be sterile. Some of the cases, the glands from which were examined for streptococci, were very far advanced. The streptococcus invasion must, in the opinion of the authors, be a very late one and only occur shortly before death.

Observations made upon the blood show a constant increase in the percentage of lymphocytes, but the total leucocytes are not increased.

The authors consider that these observations throw a new light upon the glandular enlargements which have been so constantly noticed in sleeping sickness, and that the disease is essentially a polyadenitis brought about by the arrest of the trypanosomes in the glands, where many of them are destroyed, but whence some escape from time to time into the blood stream and thus occasion the increase which has been observed in the peripheral circulation.

They regard their observations upon the presence of trypanosomes in number, in the lymphatic glands of both early cases of trypanosomiasis and advanced cases of sleeping sickness, as affording important evidence of the unity of these diseases, and further proof that the trypanosomes are the essential cause of sleeping sickness.

Snake Bite.

Mori. Case of Snake Bite treated with Potassium Permanganate, *Gazetta degli Ospedali delle Cliniche*, 1904, March 6th.—In a boy aged 14, in whom all the signs and symptoms of intense snake bite poisoning were present, Mori administered two injections of a 1 per cent. solution of potassium permanganate around the wound, which had been previously incised and disinfected, and the limb encircled by a tourniquet on the proximal side of the wound. An injection of the permanganate solution of the same strength was also introduced into the median cephalic vein. Injections of camphor were also given every four hours. The patient recovered.

Yellow Fever.

Precautions against yellow fever in Mexico consist of (1) the obligatory isolation of patients suffering

from yellow fever; (2) obligatory notification of the disease; (3) strict and continued domiciliary visits; (4) destruction of infected mosquitoes; (5) destruction of the larvæ of *Stegomyia fasciata;* (6) medical inspection of suspected and sick persons; (7) disinfection of all vehicles in which sick or suspected persons have travelled; (8) the establishment of sanitary stations to exercise vigilance over passengers who travel by railroad, coach, on horseback or on foot.

Yellow Fever and Stegomyia.

Carter, H.R. Some Characteristics of *Stegomyia fasciata* which affect its Conveyance of Yellow Fever, *Medical Record*, 1904, May 14th. Summary.—Among the special characteristics of the Stegomyia which affect its *rôle* as a carrier of yellow fever are:—

(1) *Its Distribution.*—This is generally between lats. 43 N. and 43 S. on the coasts and low plains of Africa, Asia, and the adjacent islands; Australia and the Mediterranean basin of Europe. It is also general on the eastern coast of America from 38 N. to 35 S. lat. On the west coast it is found at Panama and Guayaquil, and its existence is *implied* from Guayaquil to Acapulco. In the United States it is general on the coast and low plains of the Southern States, except Maryland.

(2) It is conveyed by vessels indefinite distances (from Cape Town to Savannah Quarantine); in much greater numbers and more often by sail than by steam vessels.

(3) It lives a long time—154 days being recorded of an infected insect. Once having acquired the power of transmitting yellow fever, it retains it apparently as long as it lives—fifty-nine days being recorded. A consideration of the three postulates above will render it advisable to safeguard the tropical countries of the East when communication is opened up between them and American ports infected with yellow fever, preferably by freeing the American ports of yellow fever.

(4) It propagates preferably in artificial containers, but will propagate in pools where such containers are not available.

(5) In America it has been reported only in the vicinity of human dwellings, and seems here not to be a sylvan, paludal, or campestral mosquito. From (4) and (5) the war against this insect in America should be waged about the houses of men, and especially against water in artificial containers. The introduction of a water supply, piped to every house so as to do away with cisterns and water-jars, is the most important measure of sanitary engineering to free a town of this mosquito. Next to this is a system of drainage by covered drains to carry off the rain water and prevent pools. Cesspools are not objectionable on this score.

(6) It unquestionably hibernates in the United States, but if the infected adult hibernates, either a very large proportion of them die, or else the infecting parasite must *generally* die in the hibernating mosquito. The first seems more probable.

(7) It is essentially a house mosquito, and is inclined to stay about the premises where it has fed. Hence the greater safety of the whole district of an infected city as compared with the residence portion.

(8) It does not feed in the dark or in bright sunlight. Therefore, in bright daylight or at night without artificial light, are the safest times to be in an infected place.

(9) The cycle of the yellow-fever parasite in the mosquito before it can be conveyed to man is generally, in hot weather, about fourteen days or over. Prior to the accomplishment of this cycle (once called the "extrinsic incubation of yellow fever") the mosquito cannot convey this disease.

(10) It is probably usually conveyed aërially less than 100 yards. In Havana the infected insect is believed to be never aërially conveyed 200 fathoms—1,200 feet—from Havana shore. The direction of the prevailing wind during the day influences its aërial conveyance.

Appointments, Change of Station, Leave, &c.

Medical men in practice abroad would find it convenient to send intimation of their movements to appear in this column; also their addresses when in Great Britain.

Dr. L. G. Barbeau is acting as Assistant Director of the Medical and Health Department of Mauritius.

Dr. J. Bolton is acting as Medical Officer and Inspector of the Immigration Department of Mauritius.

Dr. O. Pritchard has been appointed a Medical Officer in the Uganda and East Africa Protectorates.

Dr. Otho Galgey, Medical Officer, St. Lucia, has been appointed an official member of the Legislative Council of that colony.

Literary References.

TROPICAL DISEASES.

TRYPANOSOMIASIS.

Brumpt, E. Du rôle des mouches tsé-tsé en pathologie exotique, *Compt. rend. Soc. de biol.*, Paris, 1903, vol. lv., p. 1496.

Dutton, J. E., and **Todd, J. L.** First Report of the Trypanosomiasis Expedition to Senegambia (1902) of the Liverpool School of Tropical Medicine and Medical Parasitology; with Notes by H. E. Annett, and an Appendix by F. V. Theobald. London, 1903, Longmans, Green and Co., 56 pp.

Gehrke. Ueber eine neue Art der Trypanosomen, gefunden beim Gekko, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1903, vol. xxix., Ver-Beil., p. 402.

Guiart, J. Morphological Considerations on the Anterior Extremity of the Trypanosome, Journ. Trop. Med., London, 1904, vol. vii., p. 6.

Hanna, W. Trypanosoma in Birds in India, *Quart. J. Micr. Sc.*, London, 1903-4, vol. xlvii., p. 433, 1 pl.

Levaditi, C. Méthode pour la coloration des spirilles et des trypanosomes dans le sang, *Compt. rend. Soc. de biol.*, Paris, 1903, vol. lv., p. 1505.

Lingard, A. The Giant Trypanosoma discovered in the Blood of Bovines, *Centralbl. f. Bakteriol.*, *&c.*, 1 Abt., Jena, 1903, vol. xxxv., p. 234, 1 pl.

Marchand, F., and **Ledingham, J. C. G.** On the Question of Trypanosoma Infection in Man, *Lancet*, London, vol. i., p. 149.

Margrave, W. E., and **Clegg, Moses T.** Trypanosoma and Trypanosomiasis, with Special Reference to Surra in the Philippine Islands. Manila, 1903, 248 pp., 8vo.
Dept. Interior Bureau of Govt. Laborat.
Biol. Laborat., No. 5, 1903.
Novy, F. G., and **McNeal, W. J.** On the Cultivation of Trypanosoma Brucei, *Journ. Infect. Dis.*, Chicago, 1904, vol. i., p. 1.
Petrie, G. F. A Note on the Occurrence of a Trypanosome in the Rabbit, *Centralbl. f. Bakteriol.* [&c.], 1 Abt., Jena, 1903-4, vol. xxxv., p. 484.
Sabrazes, J., and **Muratet, L.** Trypanosome de l'anguille, processus de division, *Compt. rend. Soc. de biol.*, Paris, 1904, vol. lvi., p. 66; also *Gaz. hebd. d. sc. méd. de Bordeaux*, 1904, vol. xxv., p. 26.
Vitalité du trypanosome de l'anguille dans des sérosités humaines et animales, osmonocivité de l'eau, *Gaz. hebd. d. sc. méd. de Bordeaux*, 1904, vol. xxv., p. 39.
Stephens, J. W. W. The Nomenclature of Trypanosomes, *Brit. Med. Journ.*, London, 1903, vol. ii., p. 1565.
Surra. *Journ. Roy. Army Med. Corps*, London, 1904, vol. ii., p. 64.
Symes, J. O. Trypanosomiasis, *Bristol Med.-Chir. Journ.*, 1903, vol. xxi., p. 325.

Sleeping Sickness.

Bettencourt, A., and **Kopke, A.**, et al. Ueber die Aetiologie der Schlafkrankheit, *Centralb. f. Bakteriol.* [&c.], 1 Abt., Jena, 1903, vol. xxxv., pp. 45, 212, 316, 1 pl.
Brumpt, E. Maladie du sommeil expérimentale chez le singe (Macacus cynomolgus), *Compt. rend. Soc. de biol.*, Paris, 1903, vol. lv., p. 1494; see also infra Dubois.
Brumpt, E., and **Wurtz.** Agglutination du Trypanosoma Castellanii Kruse, parasite de la maladie du sommeil, *Compt. rend. Soc. de biol.*, Paris, 1903, vol. lv., p. 1555.
Castellani, A. La malattia del sonno, *Sperimentale Arch. di biol.*, Firenze, 1903, vol. lviii., p. 781.
The History of the Association of Trypanosoma with Sleeping Sickness, *Brit. Med. Journ.*, London, 1903, vol. ii., p. 1565.
Doenaça, A. Do Somno, *Med. contemp.*, Lisbon, 1903, vol. xxi., p. 381.
Dubois, R. Remarque à propos de la communication de M. Brumpt sur la maladie du sommeil expérimentale sur le singe, *Compt. rend. Soc. de biol.*, Paris, 1903, vol. lv., p. 1638.
Etiology, The, of Sleeping Sickness, *Lancet*, London, 1903, vol. ii., p. 1730.
Gélineau. Somnose et narcolepsie, *Chron. méd.*, Paris, 1903, vol. x., p. 821.
Guiart, J. La maladie du sommeil, *Bull. d. sc. pharmacol.*, Paris, 1903, vol. vii., p. 386.
Habershon, L. H. The Case of Trypanosomiasis and Sleeping Sickness, *Brit. Med. Journ.*, London, 1903, vol. ii., p. 1565.
Jarvis, C. La maladie du sommeil, d'après les récents recherches, *Presse méd.*, Paris, 1903, vol. ii., p. 869.
Kermorgant. Répartition de la maladie du sommeil dans le gouvernement général de l'Afrique occidental française, *Bull. Acad. de méd.*, Paris, 1903, 3 s., vol. l., p. 655.
Nicolas, A. La maladie du sommeil, les trypanosomes, la tsétsé, *Journ. de méd. de Paris*, 1904, 2. s., vol. xvi., p. 39.
Royal Society (London). Reports of the Sleeping Sickness Commission, London, 1903, 8vo, Nos. 1-4.
Sambon, L. The Elucidation of Sleeping Sickness, *Lancet*, London, 1904, vol. i., p. 228.
Sleeping Sickness, The. Experiments with Carbolic Acid and Arsenic, *Indian Lancet*, Calcutta, 1903, vol. xxii., p. 969.
Wurtz. La maladie du sommeil, *Semaine méd.*, Paris, 1903, vol. xxiii., p. 413.

EXCHANGES.

Annali di Medicina Navale.
Annali d' Igiene Sperimentale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Esercito.
Hong Kong Telegraph.
Il Policlinico.
Indian Medical Gazette.
Indian Medical Record.
Interstate Medical Journal.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Medical Review.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
Sei-i-Kwai Medical Journal.
The Hospital.
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Transactions of the American Microscopical Society.
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Original Communications.

FILARIASIS AND YAWS IN FIJI.

By Raoul de Boissiere, M.D.
Principal Medical Officer, Bua, Fiji.

Filariasis is extremely prevalent in Fiji, and in my own province, Bua, it is especially so. The individual adult who has not been attacked in some way or other by this disease is the exception. The most common manifestation of the disease is the condition of varicose groin glands, with occasional attacks of filarial fever. Owing to the very severe rigor which commonly accompanies the early stages of filarial fever, this has frequently been mistaken for malaria by the laity. But I need hardly say that malaria is unknown among natives who have never left Fiji, though it is very prevalent in certain of the other South Pacific Islands.

Treatment.

In such cases of filarial fever as appeared to be mainly due to lymphangitis in connection with varicose groin glands, the employment of the following plan of treatment appeared to be of value. Absolute rest in bed and a milk diet was insisted on; a hypodermic injection of antipyrin, gr. vii., and sodium salicylate, gr. x., was given twice in twenty-four hours, the injection being made into the lower part of the thigh, and an ointment containing guaiacol and menthol was rubbed in over the affected groin or groins, as the case might be. Sometimes a lotion containing menthol and spirits of wine was also very freely applied to the inflamed areas, and this appeared to give prompt relief to patients who were in great pain. The result of the plan of treatment just sketched appeared to be very favourable among the ten patients who had been selected at various times for experiment. Pain was promptly relieved, the patients appeared much brighter, while the temperature often fell several degrees in a few hours and remained low. I recall one case in particular, an adult male, aged 25, who was admitted at about 11 a.m. one morning. He was very restless and appeared to be in great pain; temperature 105° F., pulse 115. The menthol and spirit lotion was rapidly applied to both groins and thighs (both sides being affected), the hypodermic of antipyrin and sodium salicylate administered, and after a little while the ointment, as described, was rubbed in over the groins. By 3 p.m. the patient was almost completely rid of his pain and appeared much brighter, while the temperature had fallen to 100° F., and was normal by the end of the following day. Other cases, less severe in type, reacted in a similarly favourable way.

YAWS.

The tertiary manifestations of yaws or frambœsia continue to occupy much of my time. As mentioned in a former letter, I had a great many opportunities for observing those remarkable sequelæ of yaws, and perhaps the following brief description of tertiary manifestations may be of interest.

(1) *Ulcers.*—These are extremely common, and are locally known as "Vidi Koso." They may be single or multiple, unilateral or bilateral, and may attack any part of the external surface of the body. They vary much in size, from a sixpence upwards. Some ulcers may get so large as to lay bare the whole of the front of the chest and some parts of the extremities, in the same patient. They may appear at a very early age, two cases in my own experience having been only 2 years and 9 months and 3 years respectively. Both these cases had had yaws or "boko" (local name) at about the end of the first year of life. They are almost always very foul and fetid, and unless treated may last a great many years or never heal at all. While in many cases the general health does not appear to suffer much, in others the individual suffers from what seems to be a chronic toxæmia, with gradual exhaustion of vital force, until death ends the scene.

(2) *Pains in Bones and Joints.* — These are not constant and are described as being "right inside the bone" or joint. There is no swelling or pyrexia in association with this. Natives call it "Sasala." Apparently salicylates have no influence on these pains.

(3) *Ulceration of the Throat.*—Known locally as "Kanailoma," this usually starts in the soft palate, but may extend to and cause most extensive destruction of the surrounding tissues. In one case seen by me there was very great destruction of the epiglottis. It tends to very great chronicity and requires energetic treatment.

(4) *Lupoid Ulceration of Face and Nose.* — This occurs either by itself or in association with the destructive ulceration of the throat just described. Unless treated it continues on its course of chronic ulceration and destruction, as is the case with a similar affection of tertiary syphilis.

(5) *Gummata.* — These may occur in the subcutaneous tissues or in the substance of the muscles, and may be of any size, from that of a pea to that of a big man's closed fist. At first they are firm and hard, but afterwards they often soften and open externally, and may cause much destruction. On one occasion I opened up a hard, firm, round gumma, about the size of an orange, situated on the front of the left upper side of the chest near the sternum. It looked exactly like a mass of bright, firm, yellowish white cheesy matter and was very firm to the touch.

Sometimes small gummata are seen affecting the lower or upper eyelid, and unless treated they may cause great destruction of the eyelids. These, as well as all gummata in general, respond extremely well to treatment.

(6) *Enlargement of the Tibia.*—This may be unilateral or bilateral and is generally very unequal, some parts being much more affected than others. The tibia may be thickened as a whole, or there may be merely a number of "nodes" on its surface. There is often pain associated with this process, and the patients insist that such pain is "inside" the bone. This affection may occur quite independently of that described under No. 2, where there is no swelling associated with the pain, and, moreover, the pains referred to above are general and not localised to the tibia, though both are manifestations of the same poison.

In connection with this enlargement of the tibia, I

have seen several cases in which the ankle-joint appeared to be much thickened owing to dense subcutaneous infiltration, and which eventually quite cleared up under specific treatment.

(7) *Synovitis.*—From time to time one sees cases of enlarged knee- or elbow-joints, the result of slow development. Such a joint may or may not be painful. The swelling may attain to considerable size. There are no evidences of inflammation, such as redness or heat, to be made out about such a swollen joint. In cases where there is pain experienced salicylates appear to be useless. Under specific treatment, however, these joints will return to the normal and show no evidence of any thickening, &c.

(8) *Dactylitis.*—This is so very like that of syphilis that I need not delay in describing it. It may be single or multiple, unilateral or bilateral, and is quite amenable to treatment.

(9) "*Soki.*"—This is the local name for a small granuloma which often affects the soles of the feet and occasionally is seen in the hands. It is very common and may appear even fifty to sixty years or more after a patient has suffered from "boko" or secondary yaws.

Besides "soki," we may often note deep fissuring and cracks in the soles of the feet, and to a less extent in the palms of the hands. I am quite satisfied that this is distinct from the fissures and cracks sometimes seen in Negroes, as in the West Indies, who have not suffered from yaws.

Such are, in brief, the common effects of tertiary yaws. I shall not delay in this letter to describe the more rare manifestations of the disease, such as, for instance, the effects on the generative organs of the female, causing a tendency to abortion, which can only be cured by potassium iodide. I will, instead, give a brief summary of the treatment found so useful by most of us for these interesting sequelæ of yaws or framboesia.

(*A*) Constitutional Treatment.

In the great majority of cases potassium iodide will be found to produce most brilliant therapeutic results. The usual dose employed by me has been gr. x., thrice daily, but occasionally larger doses must be given, such as gr. xx. To a less extent the employment of mercury will be found useful. In certain cases, however, that do not appear to do extra well under iodide of potassium, the additional use of liq. hydragyri perchloridi, ♏ xv. to ♏ xxx., thrice daily, has appeared to be of great benefit.

In those cases where a certain amount of anæmia is present, and especially in the case of young children, I think that the syrup of the iodide of iron answers better than the iodide of potassium.

The effects of the above treatment appear very marvellous in certain cases, such as gummata, which disappear with very great rapidity. One can often note vast improvement from day to day in the resolution of a gumma, swollen joint, pains in bones generally, &c.

(*B*) Local Treatment.

In certain cases this must be employed in order to hasten a favourable issue.

(*a*) Ulcers: these are first thoroughly scraped, cauterised with zinc chloride (gr. 40 to ℥ i. of water), and freely dusted over with iodoform. Thereafter they are antiseptically dressed daily. Under such measures they rapidly heal, leaving firm, very dense, hard, white cicatrices.

(*b*) In ulceration of the throat, the "kanailoma" of the Fijian, much benefit is derived from a menthol-iodine glycerine paint.

(*c*) In lupoid-like ulceration of face and nose, salicylic and mercurial ointments are often of much help in causing resolution.

(*d*) For immediate relief of pain when localised, or in cases of framboesial synovitis, the repeated application of small fly blisters, about the size of a half-crown piece, only long enough to cause hyperæmia, and stopping short of actual blistering, appear to be of much service.

In various other affections local treatment may also be of much value, but from my personal observations I am convinced that potassium iodide is the agent which we must rely on in the treatment of tertiary framboesia in the vast majority of cases. Local measures, though extremely useful, are not essential generally.

That these manifestations are the sequelæ of yaws or "loko," I have not the shadow of a doubt. This is the general opinion, I understand, of all those who have worked among Fijians. Such sequelæ may also be observed among non-Fijians, such as Europeans, Indians, Polynesians, &c., who have contracted yaws in Fiji, and in these cases the lesions are exactly similar to those found in Fijians. On the other hand, I am confident that these manifestations have never been found in non-Fijians who have not suffered from yaws or syphilis.

Yaws and Syphilis.

The relationship of yaws to syphilis appears to be a most intimate one. Perhaps my summary of such relationship may be of interest.

(1) Both may be divided into primary, secondary and tertiary stages.

(2) The remarkable similarity of the tertiary manifestations of both. In my own experience I have seen patients (Fijians) suffering from gummata about the lower end of the sternum which would have been taken to be tertiary syphilis by 99 per cent. of medical men.

(3) The effects of treatment producing such favourable results, especially in the tertiary stage, where the similarity of lesion is greatest. This appears to me to be different from the example quoted in Manson's "Manual of Tropical Diseases," page 531, that though "sulphur will cure scabies and pityriasis versicolor, yet from this circumstance we may not conclude that these diseases are identical." There is absolutely no other argument that could be used to support the identity of scabies aud pityriasis except the therapeutical one. There is no similarity between the lesions of these two diseases, &c., whereas the case of yaws and syphilis is very different.

(4) Fijian yaws appear to confer an immunity against syphilis.

No one has ever observed syphilis in a Fijian, and this notwithstanding that there are no less than

20,000 Indians in Fiji, among whom syphilis is extremely prevalent. That the two races do mix together has been conclusively proved by the fact that one sometimes sees Fijians who have contracted gonorrhœa from Indian women. Moreover, besides Indians there have been numbers of Europeans, Polynesians, &c., who have failed to infect the Fijian, though themselves the victims of syphilis.

On the other hand, there are undoubted differences between the two diseases, such as the mode of infection, the character of the secondary eruptions, the rare occurrence of tertiary frambœsial affections of the nervous system, the affection of the permanent teeth, &c., but on careful consideration these differences are very often easily explicable.

A few differences between yaws and syphilis will always remain, which can only be accounted for by saying that while syphilis and Fijian yaws are *not identical at the present time*, yet there is great evidence to show that *at one time* they must have been most intimately related, and that such intimacy was so great that these two diseases must have developed from a "parent form" common to both. During the course of their evolution certain specific differences appear to have developed, and so account for the fact that Fijian yaws is at least a close "first cousin" to syphilis to-day.

ANALYSIS OF 2,739 BANTU OUT-PATIENTS.

By Neil MacVicar, M.B., C.M.Edin., D.P.H.

Victoria Hospital, Lovedale Mission, Cape Colony.

In a letter, dated Cape Colony, May 14th, 1904, sent with this interesting communication, Dr. MacVicar states:—

"I am sending you herewith a rough analysis of my native out-patients for the fourteen months ending December last. The patients referred to are chiefly Kaffirs and Fingoes. I have not included Europeans or Hottentots, as their mode of life is entirely different from that of the Kaffirs and other Bantu peoples.

"The most important points, I think, are the great prevalence of tuberculosis, the prevalence of scurvy in a country population but acquired in the towns, and the prevalence of infantile bowel complaints.

"Minor points of interest are the occurrence of a well-marked case of diabetes mellitus, and of a pretty large proportion of cases of trachoma. It has been doubted whether diabetes mellitus occurs at all among African races. In India the disease is said to be rare, except among highly-educated Indians. My patient is a theological student.

"The proportion of patients suffering from trachoma is, I think, larger than is usually supposed to be the case among native Africans."

I.—Infectious and other Organismal Diseases.

Tuberculosis affecting the lungs (phthisis)	148
,, ,, lymph glands	30
,, ,, bones and joints	10
,, ,, the peritoneum	2
,, ,, skin (lupus)	1
	191

Note.—In addition to these, the majority of the cases of pleurisy and some of those of pneumonia and bronchitis were without doubt tubercular; also a few out of the other categories. Considerably over 200, therefore, of our out-patients were suffering from tuberculosis.

Yaws	7	Enteric fever	30
Syphilis (secondary 6, tertiary 5, congenital 6)	17	Mumps	10
Leprosy	4	Influenza	225
Beri-beri (?)	1	Whooping cough	181
Small-pox	1	Dysentery (adults 55, infants 69)	124
Chicken-pox	3	Enteritis and gastro-enteritis in infants	127
Rheumatic fever	1		

Note.—Adding together the cases above mentioned as enteritis, gastro-enteritis and infantile dysentery—as indeed the distinction between them is probably rather one of degree than of kind—we find that during the fourteen months to which the figures refer there has been a distinct seasonal variation.

1902		1903											
Nov.	Dec.	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
7	23	36	27	16	7	11	6	21	8	6	7	5	16

Though the month of July seems to be an exception, on the whole these infantile bowel complaints have been much more prevalent in the hot weather than during the rest of the year.

Taking the year 1903 alone, the four hot months, January, February, March and December, show 95 cases, while the other eight months together show only 71. In this respect these bowel complaints resemble the summer diarrhœa which is so fatal to hand-fed infants in England. Kaffir children are nearly all partly hand-fed from their earliest infancy, and, as is well known, there is a high rate of mortality among them.

II.—Tumours.

(*a*) Malignant	10	(*b*) Simple	13

III.—Diseases due to the Lack of Suitable Food.

Scurvy (*Mtshetsha*) 64

Note.—Most of the sufferers from scurvy are young men who have been working in the towns, most commonly Cape Town, and were taken ill there. Nearly all say that while at work they lived upon tea and bread, with meat once a week, neither milk or vegetables entering into their diet.

Rickets	13	Emaciation in infants	6

IV.—Diseases caused by Poison.

Nicotine poisoning (from too heavy smoking)	4	Lead poisoning	2

Of the lead poisoning cases, one was a printer, the other a carpenter who had been handling paint.

V.—Diseases of the Digestive System other than those already Mentioned.

Stomatitis	10	Failure of pancreatic digestion (cause ?)	1
Thrush	4	Intestinal parasites	106
Hæmorrhagic bullæ in mouth	1	Diarrhœa in adults	3
Teething	107	Constipation	56
Tongue-tied	2	Appendicitis (all mild cases)	18
Gastric ulcer (?)	1	Colic (infants 20, adults 7)	27
Indigestion	117	Colitis	2
Gastric catarrh	1	Inguinal hernia	1
Liver, enlarged	8	Impaction 1, fissure 1, hæmorrhoids 1, prolapse 1	4
,, congested	15		
Diabetes mellitus	1		

VI.—Diseases of the Respiratory System other than those already Mentioned.

Nasal catarrh 2, post-nasal catarrh 4	6	Deep ulceration of pharynx (? tertiary)	1
Ozæna	2	Laryngitis	20
Nasal polypi	1	Catarrh of trachea	9
Epistaxis	6	Bronchitis (acute 124, chronic 33)	157
Ulceration of mucous membrane of nose	2	Lobar pneumonia (in adults)	18
Chancre of nasal mucous membrane	1	Pneumonia (in infants and children)	39
Uvula elongated	6	Emphysema	9
Adenoids	2	Pleurisy	56
Tonsils, enlarged	12	Empyema	2
Tonsillitis (follicular 12, quinsy 1, simple 3)	16	Asthma	25
Pharyngitis	52		

VII.—Diseases of the Circulatory System.

Valvular diseases of the heart	23	Fatty degeneration of the heart	2
Dilatation of the heart	43	Congenital malformation of the heart	1
Senile heart	17	Nervous palpitation	93
Angina pectoris	3		

The last named is common among native women. It usually dates from the loss of children or other relatives, and it may continue for months or even years.

Senile gangrene of the foot	1	Varicose veins	1

VIII.—Diseases of the Nervous System.

Meningitis	5	Nervous excitability in children	3
Nervous sequelæ of lightning accident	1	Convulsions from causes other than epilepsy or hysteria	9
Epilepsy (major 14, minor 2, Jacksonian 1)	17	Lunacy	2
Hemiplegia (complete or partial from cerebral hæmorrhage 4, thrombosis 1)	5	Neurasthenia, or nervous exhaustion	15
Hemiplegia from embolism	1	Sick headache (megrim)	43
Hypochondria	9	Headache due to exposure to the sun	7
Feigned sickness	2	Headache due to causes other than above	33
Drowsiness	1	Neuralgia of the face or head	24
Hysterical convulsions	10	Intercostal neuralgia (see also herpes)	2
,, hemianæsthesia	1	Sciatica	22
,, spine	3	Facial paralysis	1
Hysteria, other forms	25	Neuritis	3

IX.—Diseases of the Kidneys, &c.

Bright's disease, chronic	3	Bilharzia disease	5
General dropsy, probably renal	2	Enlargement of prostate	4
Hydronephrosis (?)	1	Gonorrhœa	13
Pyonephrosis	1	Gonorrhœal sequelæ	4
Stone in the bladder	1	Hydrocele	6

X.—Diseases of the Skin.

Eczema	12	Sudamina	3
Impetigo contagiosa	17	Ichthyosis	1
Acne	10	Scabies	6
Parasitic diseases, resembling ringworm	6	Psoriasis	3
Leucoderma	1	Boils	3
Herpes (of the face 4, of the palate 3, zona 2)	9	Chilblains	2
Urticaria	11	Prickly heat	1
Prurigo	3	Eruption after eating pork	1
		Other eruptions (nature ?)	6

XI.—Injuries.

Fractures (femur 1, clavicle 2, rib 1, fibula 2)	6	Skin of back injured with sheep dip	1
Sprains and bruises	9	Others (fall from a horse, gored by ox, dog-bite, bite from man, sjambok, &c.)	8
Wounds (of the head 3, of the extremities 5)	8		
Burns and scalds	5		
Foreign bodies (needles 5, others 2)	7		

XII.—Suppurations, &c.

Acute abscess (breast 1, eyelid 1, glands in neck 1, scalp 1, thigh 1)	5	Mastitis (acute 1, chronic 1)	2
Cellulitis	1	Housemaid's knee	1
Gum-boil	3	Knock-knee	2
Suppurating hand	1	Simple inflammation of knee-joint	3
Wasting of hand, sequel of suppuration	2	Flat foot	2
Stiffness of hands, result of exposure to cold	2	Closure of jaw	1
Carbuncle	1	Ulcer on shin	2
Suppuration of knee-joint	1	Obscure swellings of leg	3
Whitlow	2	Subcutaneous nodules (? rheumatic)	1
		Chronic periostitis of tibia	1

XIII.—Miscellaneous General Diseases.

Lumbago and other muscle pains	107	Goitre	1
Chronic rheumatism of joints	19	Anæmia	1
Debility	7	Exhaustion from prolonged lactation	19

XIV.—Diseases of the Eye.

Conjunctivitis, catarrhal	30	Conjunctivitis, trachoma	22
,, strumous	36		

Note.—In many of the above cases the cornea was also affected.

Ulcer of cornea	1	Cataract (senile 10, traumatic 2, others 2)	14
Abscess of cornea	1	Opacity of vitreous	1
Ectasia 1, staphyloma 2	3	Blindness from atrophy of optic nerve or disease of retina, incurable	4
Blindness from corneal cicatrix	1	Short sight 3, long sight 1	4
Scleratitis	2	Blepharitis	4
Phthisis bulbi	2	Everted punctum	1
Iritis 1, irido-cyclitis 1	2	Suppuration of lachrymal sac	2
Glaucoma (primary 3, secondary 3)	6		

XV.—Diseases of the Ear.

Suppuration of middle ear	34	Earache	3
,, mastoid cells	1	Deafness from obstruction of Eustachian tubes	1
Periostitis of mastoid	1	Deafness from disease of inner ear or auditory nerve (Two of these followed enteric fever.)	4
Boils in the external auditory meatus	1		
Insect in external auditory meatus	1		

Tinnitus (also sequel of enteric fever) .. 1

XVI.—Obstetric and Gynæcological Cases.

Obstetric	7	Gynæcological	20

XVII.

Cases undiagnosed .. 22

Note.—A number of these were not seen. Friends came for medicine.

XVIII.

Tooth extractions .. 70

XIX.

Applicants examined for admission or re-admission to Lovedale Institution .. 306

XX.

Prisoners examined by request of magistrate with a view to lunacy certificate 3

Total .. 3,539

Note.—This number, 3,539, is the number of diseases from which the 2,739 individual Bantu out-patients were found to be suffering at one time or other of the year. Some came twice, with a different complaint each time. Some had more than one disease in progress at the same time.

NOTES ON 1,784 CASES OF MALARIA.

By Laura M. Hope, M.B., Ch.B.
Pabna, North Bengal, India.

These 1,784 cases of malaria were seen during the twelve months, April 1st, 1903, to March 31st, 1904, at Pabna, North Bengal, and form 37 per cent. of all patients seen during that time by Dr. C. H. S. Hope and myself. In each case of suspected malaria the blood has been examined microscopically; only those giving a positive result are included. The cases are classified, according to the nature of the parasite found microscopically, into quartan, benign tertian, and æstivo-autumnal (or malignant tertian) infections, and into infections with one, two, or three different forms

of parasites. For brevity a quartan infection is recorded by Q., a benign tertian by T., an æstivo-autumnal by A.A., and mixed infections by combinations of these initials. By reference to the accompanying table it will be seen that quartan parasites greatly predominate. A large proportion of the cases harbouring quartan parasites gave a history of daily fever and various sizes of the parasites were found.

Nature of Infection.	Q. only	A.A. only	T. only	A.A. and T.	A.A. and Q.	Q. and T.	A.A., Q. and T.
April, 1903	46	61	49	7	3	1	—
May	60	28	27	3	—	3	2
June	85	16	9	3	3	1	1
July	72	19	16	3	1	1	—
August	64	28	7	1	—	1	—
September	51	38	9	3	2	1	—
October	49	62	7	2	—	1	—
November	51	81	25	2	5	4	1
December	69	78	23	7	—	—	—
January, 1904	123	72	16	—	2	2	—
February	122	35	9	—	2	3	2
March	141	29	20	2	4	4	4
Total for twelve months	933	547	217	33	22	22	10

The number of A.A. infections in which crescents were detected was 152, in 60 of which *only* crescents were detected.

So small a proportion of the cases seen had quinine before the examination of the blood that the determination of the infection in most was simple. In the majority a single examination of the blood was sufficient, and films stained with Leishman's modification of Romanowsky gave the most satisfactory and certain results. In benign tertian infections the fine stippling (Schüfner's dots) of the parasite-containing corpuscles so constantly present enabled one to have no doubt about them; and the coarse stippling of the infected corpuscles not infrequently aided one in A.A. infections. The chief difficulty arose when only young parasites of ring form were present. The nature of these was sometimes confirmed by a second later examination, or by finding a sporocyte or a crescent.

As regards the number of parasites present—though in many cases they have been so few that it has been difficult to find one parasite—when abundant, of the three varieties, A.A. parasites have often been counted by numbers, up to 100, in each field of the microscope; T. not more than about 20 in a field; and Q. seldom more than 2 or 3. Not infrequently, in patients with severe fever, when the parasite found was Q. it was only detected after a prolonged search.

In stained specimens one characteristic of many of the quartan parasites which we have remarked, but not seen noted elsewhere, is that instead of the ring form, the very young parasite appears as a streak passing from one side of the containing erythrocyte to the other, the chromatin (with Leishman's stain) showing as an irregular red line, sometimes also stretching across the corpuscle from one edge to the other. In the older stages of this form of parasite, up to half to two-thirds of the full size, the constituents parts, chromatin, protoplasm, and especially the pigment, all tend to be arranged in streaks, running parallel with one another, and in the longer dimension of the parasite, giving the whole a laminated appearance and a roughly quadrilateral form.

The number of malaria cases seen in each month varied from 101 in August, 1903, to 215 in January, 1904, the total number of patients seen in each month being fairly constant. Roughly, an equal number of cases occurred in children and in adults, the figures being 862 children and 922 adults (*i.e.*, fifteen years and over).

The spleen was palpable in most of the cases. In 374 it is recorded as not palpable. In 43 it extended below the umbilical level, in 1 case it reached the iliac crest, in 2 to the level of the anterior superior iliac spine, in 1 to the pubes. In these cases having markedly enlarged spleens, *i.e.*, extending below the umbilical level, it is remarkable that at the time of examination only 10 were infected with A.A. parasites, while 32 had Q. infections, with or without other parasites. These 10 A.A. infections include 5 cases of mixed infections, *i.e.*, 2 of Q.T. and A.A., and 3 of Q. and A.A. Nine of these cases with very large spleens had T. infections, including 4 mixed, *i.e.*, 2 of Q.T. and A.A., and 2 of T. and Q. This suggests that the great enlargement of the spleen is caused rather by Q. infections than by A.A. or T.

As regards treatment, almost every case has yielded to quinine sulphate in solution within a very few days, mostly after the first or second day. In very few cases has resort to hypodermic injections of quinine been found necessary. Euquinine has been useful in cases with vomiting. No case has been fatal, so far as is known, though several were of malignant type. The majority were old-standing cases, many of several months' duration, some of quartan having even continued for two and three years without a break, according to the history.

During the latter half of the twelve months, on account of frequent relapses, an attempt was made to insist on a month's course of quinine, but judging from the number of cases which returned within a few weeks infected with a different form of parasite, one wonders whether it is much use to persist in the treatment for long after the fever yields where the people are so exposed to infection. Many of the patients have come from very malarious parts and are too poor and ignorant to do much in the way of prophylaxis.

After completing a full month's course of quinine, eight patients have returned within six months with a different form of parasite, the first infection apparently cured; but after shorter courses of quinine, varying from four to twenty-four days, within the twelve months, more—*i.e.*, 17—have returned with a different parasite, that of the first infection not being discoverable. Of these 17 cases, the new infection has been in 14 A.A., and in 3 T.

Of 15 apparent relapses, *i.e.*, the same parasite found after a full month's course of quinine, 7 have returned within six months with A.A. parasites, 7 with T., and 1 with Q. Two cases of tertian infection had *two* apparent relapses within six months. For the first attack they had respectively thirty-two

and thirty days' quinine, for the second, forty and thirty-two days. As only one case of Q. infection has returned with a relapse after a full month's course of quinine, this would appear to be, as a rule, sufficient treatment for Q. infections. Of course, it is not unlikely that some of these *apparent* relapses are in reality fresh infections.

Benign tertian infections seem to have here a very severe effect. In many cases the prostration and anæmia caused in children is most marked, and these infections have proved as refractory to treatment as any. Two cases, first seen with a combined T. and A.A. infection (crescents in one), for which a thirty-six days' course of quinine was given, returned, one in ten weeks, the other in twelve weeks, with a relapse of fever, T. parasites only being then detected; so that T. infections would also appear to be more persistent than A.A.

TRYPANOSOMIASIS IN MAN.

By Guy R. Ruata, M.D.Turin.
Of the London School of Tropical Medicine.

(*Continued from p.* 168.)

Manner of Infection.

If we consider the geographical distribution of this disease, we are at once impressed by the fact of the connection of the disease with rivers and lakes, with the low-lying places—shambas—surrounded by forest growth, or banana and potato plantations, or with wooded districts, not far from water; and, as in the case of malaria, its absence from populous centres.

The remarkable peculiarity of this disease is its close connection with water. Corre also, many years ago, laid special stress on the paludal nature of the centres of this infection at Joal and Portudal in Senegambia.

Another characteristic feature is its patchy distribution, as I pointed out before: it clings to particular villages, attaching itself to a particular house or to a group of houses.

What is the reason of this peculiar distribution? It cannot be due to a food poison, the native outside and inside the narrow infected strip having the same habits. If, then, the infection cannot be conveyed by food or water supply, or directly from man to man, it must be carried by some blood-sucking insect.

Observation shows that this infection is not contagious in the usually accepted term, although certain conditions are necessary and favourable to its propagation, much as a person suffering from malaria. This characteristic analogy receives confirmation by the remark that the method of propagation is similar to that of malaria.

As Bruce in 1894 proved that the parasite of nagana or tsetse-fly disease of Zululand is conveyed directly from infected to non-infected animals by the bite of a diptera, *Glossina morsitans*, so, analogously, another or similar blood-sucking insect might be the carrier of the parasite to man. This important point of the question was clearly demonstrated by Bruce. He proved that a tsetse-fly, *G. palpalis*, is the carrier of *Trypanosoma Castellanii*, the geographical and zoological distribution of this insect coinciding with the distribution of sleeping sickness. This observation bears out Dr. Sambon's prediction, that the tsetse-fly would be found the medium of transmission of the disease.[1]

Along the wooded portion of the lake shore of Victoria Nyanza, as well in Uganda and Busoga provinces, the *G. palpalis* was found; the disease and the fly are limited to the shores of the lake and to the islands. Dr. Nabarro states that "the fly does not proceed up the swampy river valleys, and that even on the coast behind papyrus swamps it is also absent." "The fly is never found in the grass of the grassy plains, even though the grass be long and tangled. It has not been found by us in banana plantations, nor at any time far from the lake shore" (Bruce).

All these remarks are very important indeed, because it is the densely-wooded shores of the lake that the *G. palpalis* frequents, and there the half-naked natives of the islands and of the mainland are accustomed to meet in thousands to trade in fish, bananas, earthenware, &c., so that all the elements for the spread of the disease by tsetse-flies are present.

Five experiments on monkeys (*Cercopithecus* sp.) showed that *G. palpalis* can convey trypanosomes from sleeping sickness cases to healthy monkeys up to at least forty-eight hours after feeding. Besides, Bruce observed that the ordinary wild tsetse-fly freshly caught and placed on healthy monkeys without any artificial feeding could convey trypanosomes to three monkeys. Bruce adds: "It is true that the trypanosomes conveyed to these monkeys may be a different species from that found in sleeping sickness; but, taking everything into consideration, the probabilities are that they are the same.

Mr. Ernest E. Austen, in his monograph of the tsetse-flies (genus *Glossina*, Westwood), based on the collection in the British Museum,[2] gives this description of *G. palpalis*: "This fly, the carrier of trypanosomes of sleeping sickness, dark brown; thorax usually paler, with dark brown marking on a greyish ground; abdomen generally with at least an indication of a pale, longitudinal, median stripe, with pale lateral triangular markings, and usually the hind margins of the segments narrowly pale; legs (except the hind tarsi and last two joints of the front and middle pairs) sometimes entirely buff-coloured; usually the femora for the most part are entirely dark brown, in well-preserved specimens clothed with greyish dust, and the tibiæ yellowish."

Austen states that the tsetse-flies are usually found on the banks of rivers and streams, and in damp, hot, low-lying localities. In these places, or fly-belts, the insects are not always found in numbers, although sometimes they may occur in swarms. The habitual food of tsetse-flies seems to be the blood of big game. They are more active during the hottest hours of the day. Bruce says that tsetse-flies bite preferably at sunset. They fly rapidly and straightly,

[1] Journal of Tropical Medicine, July 1, 1903.

[2] Longmans and Co., London, 1903.

descending suddenly and pertinaciously upon the animal attacked. Probably they cannot reproduce their kind until and unless they obtain a meal of blood. Relative to that fact Sambon suggests that in the pupiparous genus of *Glossina* the association with water may be related to the habit of feeding on fish by the fact that trypanosomes are very common parasites among fish.

Another important point of the life-history of the genus *Glossina* is that these flies do not lay eggs as the majority of the diptera, but extrude yellow-coloured larvæ nearly as large as the abdomen of the mother. Immediately on being born this larva creeps about with a good deal of activity, evidently searching for some cover or hole in which to hide. Having found a resting place it immediatly begins to change colour, and after a few hours has turned into a jet-black hard pupa or nympha.

In 1894, Bruce, studying the disease of nagana in Zululand, proved that the tsetse-fly itself could not give rise to any pathological symptom in susceptible animals, but, as they are blood-sucking insects, they could convey the disease from an affected to a healthy animal by means of the sucked blood, like the cattle tick — *Ripicephalus sanguineus* — in hæmoglobinuric cattle fever (Texas fever) inoculates into the body of another bovine a protozoal organism, *Pirosoma bigeminum.*

A comparison with malaria arises: does the *Trypanosoma Castellanii* rest for a time within the new host? Do changes occur similar to those undergone by the malarial hæmamœba in the stomach walls of the mosquito? Is the *Glossina* a definite host for trypanosoma, as Anopheles are to malaria parasites? We are not in a position yet to give these questions a definite answer. We cannot say but that the method of transmission of this disease might be perhaps simply a mere mechanical transference of parasites from one animal to another by means of the proboscis of the insect.

An interesting fact in connection with this is, the parasite of the lower animals cannot live even a few hours in the insect's proboscis during the dry season, owing to the excessive lack of moisture in the atmosphere. This observation of Dutton and Todd on trypanosoma in West Africa was suggested to them by Mr. Hewby, a travelling commissioner in Northern Nigeria. He noticed that his ponies, after passing through a certain area of bush in the wet season, often became ill and died of fly disease. Ponies sent through the same part of the bush in the dry season, however, escaped, although the flies, which he says are the same as *Glossinæ,* which we showed to him, were always present in great numbers.[1]

Dr. Sambon, in view of the geographical limitation and the probability of a double alternating cycle in the life-history of the trypanosoma, believes that *Glossinæ* act as the definite hosts of trypanosoma.

Clinical Features.

The clinical and microscopical observations of the last five years prove that the occurrence of trypanosomiasis in man in tropical districts is by no means common, and that this disease, believed to be peculiar to the lower animals, has been diagnosed not only in natives but also in Europeans.

The difficulty in the morphology, pathology and biology of the human trypanosoma has now been removed since Castellani's discovery and Bruce's experiments, the trypanosoma having been proved to be the cause of sleeping sickness.

In the study of the ascertained clinical features of this infection we must consider them in two stages, as they affect natives and Europeans.

First Stage—Trypanosomiasis Fever.

(α) *In Natives.* — Our present knowledge of this subject is too incomplete and insufficient to allow us to give an exact account of it, because the published information is very meagre. Indeed, we cannot state that the signs and symptoms are constant, as occurred in Baker's three cases, owing to the long asthenic period of incubation of the infection, due to the resistance of the native's body to every kind of infective ailment peculiar to the place. This kind of racial immunity, which we can observe in most tropical infections, holds good also amongst the animals. We can affirm, however, that the presence of trypanosomes in the blood of natives who have no fever can allow us to anticipate the diagnosis of trypanosomiasis.

(β) *In Europeans.*—Although Nepveu in 1890 found, in Algiers, a trypanosoma in man, the idea of human trypanosomiasis as a distinct disease was due to Forde and Dutton; the first in 1901, in the River Gambia colony, found the parasite in the blood of an European suffering from an anomalous form of fever; the latter was the first who described the trypanosoma scientifically. In September, 1902, Manson diagnosed a case of trypanosomiasis in a patient, the wife of a missionary on the Upper Congo, where she resided for about a year. Dr. Le Moal found the parasite in another case in Brazzerville, French Congo; Brümpt, in Boma; and subsequently Dr. Broden, of the Leopoldsville Bacteriological Institute, found another case of trypanosomiasis in an officer whose blood swarmed with the parasites.

If we analyse the history of each case we are struck by its peculiar origin, because the patients ascribe their illness to the bite on the limbs by some insect, presumably a tsetse-fly (*G. palpalis ?*). The bite inflamed, swelled, and in a space of time varying generally from two or three days to a fortnight after being bitten, the first of a long series of recurring attacks of fever began. This is a constant feature of trypanosomiasis in Europeans. After a variable period of incubation the infection, preceded by a feeble rigor, causes an erythematous rash on the face and trunk, and high temperature, with or without vomiting.

The high indolent fever is not amenable to quinine, nor to the usual antipyretics, and after continuing for several days (eight to ten) the temperature rapidly falls to normal. The remission has no definite character in its duration, and is followed by another attack of fever, then by a subsequent remission, and so on. The temperature is high in the evening and low in the morning. A peculiar characteristic of the temperature is its irregularity, but it never rises very high,

[1] Journal of Tropical Medicine, November 16, 1903.

and is of a relapsing, undulant type. Night sweats are common. The pulse rate is always fairly rapid, 100 to 150, due to a peculiar cardiac irritability. The respiratory rate is not generally similarly increased and is irregular in type. In some cases (Dutton) increased frequency of pulse and respiration occur regularly together.

The lesions of the skin preceding, or it may be subsequent to, the fever, are represented by a peculiar circinate erythema (described by Forde, Dutton, Manson and Daniels) accompanying œdema of the skin and subcutaneous tissue.

(*a*) The patient has a drunken aspect, and shows localised skin congestion, more marked on the trunk and thighs, where patches of erythema occur in circles and half-circles, varying in diameter from an inch to a foot. The intensity and the number of patches vary; they may exist as irregularly scattered, purplish-coloured areas, caused by localised congestion of the superficial capillaries. The erythema fades on pressure, after which the purplish colour returns slowly or quickly.

(*b*) The œdema, irregular in type, is pronounced on the lumbar and sacral regions and around the ankles, less so on the lower parts of the legs, and but slightly marked on the trunk, and on the face it causes a distinct puffiness and fulness of the lower eyelids. The characteristic œdema of the face, varying in degree, is often combined with flushing, sunken eyes, and watery conjunctivæ. There were also noted marked muscular weakness, general wasting, the occurrence of a transient paralysis, and thrombosis of the veins of the leg; the last two are not constant symptoms.

In some cases there occurred a peculiar condition of the fundus oculi, a disseminated sporoidal atrophy, with pigmentary disturbance, iritis, cyclitis, and optic neuritis (Manson).

The anæmia is not marked; there may or may not be present an increase of mononuclear leucocytes. On this fact Manson writes: "If this is a feature of trypanosomiasis infection, the value of the symptoms in the diagnosis of doubtful malaria cases is very much discounted. A mononuclear leucocytosis may be a feature common to several types of protozoal infection." The spleen is not always enlarged; its area is sometimes tender.

Second Stage—Lethargy.

Lethargy, the terminal or fatal stage of the trypanosomiasis, which, until a few months ago, constituted a peculiar clinical entity, was first observed and described by Winterbottom in Sierra Leone. Athough the name sleeping sickness is more commonly used, it seems to me better to discontinue this name, because a proper sleep is not a symptom of the disease.

Persons Attacked.

The disease affects either sex in equal proportion. The large majority of cases occurs among agriculturists and those who live in the low-lying country in places along or near the shores of rivers or lakes.

(*To be continued.*)

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THE

Journal of Tropical Medicine

June 15, 1904.

CANCER ENQUIRY IN TROPICAL COUNTRIES.

IMPORTANT NOTICE.

We again draw attention to the imperative necessity of gathering information as to the presence or absence of malignant diseases in tropical countries if the present investigation of cancer is to attain scientific value. It is stated by several observers that cancer is absent in many native races in warm climates, but the truth of these statements has never been submitted to accurate enquiry. The evidence, for the most part, is mere hearsay, and therefore valueless. That there may be people in various parts of the world amongst whom cancer is not known may or may not be true, but if cancer is known to be absent in any section of the human race, important results might accrue by instituting a careful enquiry into the reasons for the immunity enjoyed. So far, however, in no list of diseases from the Tropics we have been permitted to examine—and they are

many—are malignant diseases absent. We have not, however, exhausted the list of countries from which it is possible to receive fairly accurate returns; and it may be that the omissions are due to medical men thinking that because no cases of the disease are found no report is necessary. This belief has led to many false conclusions in the past, and will no doubt continue so to do. The absence from a country of a specific disease, whatever the nature be, is of primary importance; if this immunity can be proved to be due to a definite local cause a great step in preventive medicine may be at hand. We appeal, therefore, to medical men in tropical practice, of which there are several thousands possessing British qualifications, to help to elucidate this problem. In order to bring the matter to a practical issue, we propose that the following procedure be followed: (1) When any tumour, which from the history of the case, the appearance of the growth, or the *post-mortem* evidence, seems suspiciously malignant, remove a small piece for examination. (2) Put the specimen in a clean bottle in methylated spirit of the usual strength (70 per cent.), or in a 5 per cent. solution of formalin. Tightly cork the bottle, shave off the cork level with the glass, and seal over (with sealing wax if at hand). (3) Pack the bottle in cotton-wool in a wooden box. (4) Send the specimen by "sample post," and write on the label "Pathological specimen, of no commercial value." The package thus labelled will cost little to send and need not be opened by the Customs. (5) Address the parcel to the office of this JOURNAL, or to the London School of Tropical Medicine, Albert Docks, London, E. (6) Send a covering letter by post with a short account of the case and the name of the sender. The specimen will be examined, and the result communicated to the Cancer Commission and published in this JOURNAL with the name of the sender. Should the observer prefer to send prepared microscopic specimens in order to have an opinion on the nature of the tumour, it is necessary in all cases to send a short clinical account of the case from which the specimen was derived.

Our knowledge of malignant growths in the lower animals is growing a-pace, and it is interesting to note that the members of the Cancer Research Fund have announced the fact that malignant diseases are met with in the horse, cow, dog, sheep, pig, mouse, cat, fowl, parakeet (Indian), giant salamander, cod-fish, gurnard, and trout. What bearing these have upon malignant diseases in man we are not even in a position to surmise, but it is plain that investigation into cancerous growths must not be confined to man if we wish to establish the research, now on foot, on a sure and lasting basis. Could, therefore, our prospective contributors include in their specimens new growths from animals, the value of their work would be greatly enhanced.

Reprint.

THE BATTLE FOR HEALTH IN THE TROPICS.

By MAJOR R. ROSS, F.R.S., C.B.

Professor of Tropical Medicine, University of Liverpool.

MAJOR RONAL ROSS, C.B., F.R.S., in an address delivered before the Northumberland and Durham Medical Society, and published in the Journal of the Society, April, 1904, gives a graphic account of the difficulties he had to contend with whilst investigating the mosquito malaria theory. We extract the following from his interesting paper:—

Gentlemen, is there anything more supremely important to men than the investigation of those great diseases which destroy them by millions? What are politics, laws and philosophies to us, compared with disease and death? The principal battle of all is the battle against disease—physical, intellectual and moral.

Now, no medical theorem has been so clearly and abundantly proved as the theorem that the malarial infection is produced by mosquitoes. The theorem explains all the ascertained facts; the parasites have been cultivated over and over again in the insects, and the infection has been frequently produced experimentally in men and birds by their bites. Moreover, the subject has been taught in every civilised country by means of innumerable books, pamphlets, lectures, placards, and newspaper articles. Both demonstration and instruction has been complete; yet I believe I am right in saying that, out of even the educated persons living in malarious places, not one in twenty really believes that fever is acquired from these insects; while among the natives, I doubt whether one in a thousand has ever even heard of the theorem. Of course the sceptics do not argue the point; that is quite unnecessary; they know well enough that all such ideas are "rubbish." For instance, in a recent number of *Chambers' Journal*, a writer on West Africa remarks: "On the question of mosquito-bites caus

ing fever there seems great diversity of opinion. Major Ross's assertions appear to be generally pooh-poohed among coasters," One gentleman—who gave us great assistance in Africa—has always avowed his utter disbelief in the whole business. When taxed with his apparently illogical behaviour, he remarked, "Well, you know, it is always advisable to soothe down the cranks." Sometimes they do condescend to discuss the point. The invariable question is, "Look here, if men get malaria from mosquitoes, and mosquitoes get it from men, where did it begin first?" If you reply that you do not know, you can see at once by the face of your catechist that you have for ever lost his confidence as a doctor. If you give the stock answer by asking, "If the egg comes from the hen, and the hen from the egg, which begins first?" he is rightly much offended. One of my colleagues and myself were once arguing with a distinguished gentleman on the steps of his verandah, overlooking one of the most malarious towns in the world. A faint haze was spread over the landscape; and the gentleman said, "What nonsense about the mosquitoes. Can you not see the malarialism rising from the earth?" "Yes, sir, replied my colleague, "and there is some of it coming out of your kitchen chimney." He also was offended. That is the worst of it—these people are always so easily offended. Another gentleman, when I made some such innocent reply, threatened to expose me in the free British press; and, what is more, he actually did so for three weeks in the *Standard*. The words he used about me were quite shocking, and a friend said to me, "Look here, you must really clear your character after this." The unfortunate thing was that I could not clear my character at all; and they never mention me in the *Standard* now. But the man who finally completed our defeat was the old coaster who asked, "See here, if mosquitoes give us malaria, why don't they give us mumps?" We could not answer at all. Even now I do not know why mosquitoes do not give us mumps; and I suppose that the same kind of questions will continue to dispose of the mosquito theory for the next century.

These little matters, apparently trivial enough, are really of great importance as regards the prevention of malaria; because they show us how little we can trust the public to defend themselves against the disease. The fact is that the public are as a mass impervious to technical demonstrations, and look upon our most approved theorems as "medical fads." Our only hope for the extirpation of malaria and other important tropical diseases on a large scale lies in Government action. And here comes the last lesson which I have to draw from this history. During my eighteen years' service in India I had acquired a very detailed training in practical tropical sanitation, and consequently, when I found the mode of infection in malaria, knew exactly the most feasible method of dealing with it. That method is, at least for towns, a scrupulous surface drainage which aims at removing the numbers of small puddles in which the Anopheles principally breed. Of course, for rural areas and for many water-logged towns the advantages would be scarcely worth the cost which the measure would involve; but for many of the principal centres of population such drainage is feasible and comparatively cheap, and would be an enormous boon. Now most large British towns in the Tropics possess sanitary departments which, if set in motion by a word from the local governments, could easily carry out the required work at a small cost; and when I left India early in 1899, I expected that such a mandate would be issued at once, and that the vast prevalence of malaria in the principal cantonments and settlements would be notably reduced within a year or so. But we live to learn. To my amazement, my advice—the rectitude of which seemed to me quite self-evident—was either ignored or rejected, or swamped by a host of impossible suggestions. People were advised to wear veils and woollen gloves, and not to go out in the evenings—in places, mind you, where it is scarcely possible to breathe on account of the heat, where mosquitoes scarcely ever bite out of doors, and where the evening is the only time for exercise. Others recommended people to live in meat-safes, or to pour quinine down the throats of everyone they met—measures practicable and useful at times, no doubt, but scarcely adapted for general use. As for getting rid of mosquitoes, the public laughed the idea out of court. Scientific big-wigs, who really knew nothing at all of the matter, supported the public, and said that mosquitoes are carried by tornadoes from the Antipodes (the truth being that they are generally bred in the back garden). In the hope of getting something done, the Liverpool School of Tropical Medicine sent me with Dr. Annett and Mr. Austen to Sierra Leone, where we showed the authorities exactly what to do. Needless to say they did next to nothing. Next we sent in a petition to the Royal Society, asking it to influence Government in the required direction. That ancient body took no notice of our petition. Next a gentleman of Glasgow gave us £2,000 to go and show the authorities of Sierra Leone how to clean up Freetown. We certainly showed them, but whether they are going to do it remains to be seen. And there we stick. Sir William MacGregor has done fine work in Lagos, and local authorities have busied themselves here and there, but for any adequate general action based upon the new discoveries we still look in vain throughout the practical British Empire.

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By Fritz Schaudinn (Rovigno).

(*Translated from the German by P. Falcke.*)

(*Continued from p.* 174.)

The smaller nucleus split off by heteropole mitosis is, in fact, the blepharoplast of the trypanosoma, and, indeed, a complete cellular nucleus with a centrosome and eight chromosomes, and not merely a centrosome, karyosom, nucleolus, or even a simple thickening of the ectoplasm, as Senn states. I can, therefore, say that the hypothesis of Laveran and Mesnil as to the nuclear nature of the blepharoplast of their trypanoplasma is correct for this form also. However, we will now still further trace the formation of the loco-

motor apparatus of the ookinet. The larger nucleus, which remains in the centre of the endoplasm, now enters into a quiescent stage (fig. 1, *d*) whereas the smaller one moves somewhat anteriorly to the border of the endoplasm by the ectoplasm, and again turns at right angles to the principal axis of the trypanosome, and is transformed into a heteropole spindle (fig. 1, *e*). The differences of the two halves of the spindle are not, however, so strongly pronounced as in the first instance, the right smaller half of the spindle is now situated quite at the periphery of the cell in the ectoplasm. After the separation of the left half of the nucleus there remains here, again, only the residue of the central spindle as a connecting filament, so that now the three different nuclei are all connected. The smallest of the three nuclei, situated quite at the periphery, again immediately forms a spindle, the longitudinal axis of which, however, is at right angles to the right spindles (fig. 1, *f*). The spindle, again, is heteropole, and the pole directed towards the front is the smaller. This third spindle now becomes transformed into the locomotor apparatus of the trypanosoma, the central spindle being excentrically situated, the undulating membrane developing at the thickened border (fig. 1, *g*) while the eight mantle fibres, corresponding to the number of the chromosomes, become eight myonema, four of each of which run along either surface of the flattened anterior part of the trypanosoma in the ectoplasm, and, at the anterior end, unite with the central spindle, that is to say, the thickened border of the undulating membrane for the formation of the conical flagellum. Corresponding with this history of development of the locomotor apparatus, which I will describe more fully in the complete work, one finds in macerated preparations that the ribbon-shaped flagella are composed of a thicker excentric axillary filament, the central spindle and eight mantle-fibrilla, the mantle filaments and only the distal tapering end of the flagellum is formed alone of the axillary filaments.

Corresponding with their genesis the nucleus blepharoplast and the commencing part of the flagellate apparatus are connected by fine achromatic filaments (the residue of the central spindles). The entire nuclear apparatus thus forms a firm anchorage for the locomotor portions of the trypanosoma situated in the ectoplasm.

The capacity for staining of the periplast of the trypanosoma with nuclear stains, which has been demonstrated by Senn and Wasielewski,[1] is explained by the chromatin contents of the mantle fibres and the central spindle. The locomotor apparatus (myonema and undulating membrane) is a product of the nucleus, the structure of the asexual trypanosoma originating from the ookinets as well as their movements, correspond so entirely with those of the trypanosoma we know, that I need not describe them more fully in this preliminary communication. I will only mention the fact that, as is the case in other trypanosomes, the blepharoplast in the more advanced stages frequently moves round the nucleus towards the back, and thereby the origin of the flagellate apparatus is also situated further back.

The form of trypanosome here described exhibits the greatest similarity with the *Crithidia* which Léger[2] found in the intestine of the Anopheles. We shall see that our form also has a gregarine-like quiescent stage, and multiplies in a similar manner, so that I am almost convinced that the *Crithidia* is a developmental stage of a nearly related parasite. Moreover, my assistant, Dr. von Prowdzek, will demonstrate in another communication that the Herpotomonas also of the house-fly is fairly similar in morphology and developmental history to the parasite here described; it is a form that deserves particular attention, because in it secondarily there is a simpler way of transmission from host to host in place of the complicated development through alternation of host. The retrogressive appearances that occur in my parasite are still more complicated, and will throw an interesting light on the subject and furnish a contribution to the phylogeny of this parasite.

We are waiting for the publication of Léger's[3] complete reports on the trypanosoma-like flagellata which he has found in various other insects, and these should prove particularly interesting in these relations.

(To be continued.)

[1] It is always tinged red by means of the Romanowsky method.

[2] Léger, L., "Sur un flagelle parasite de *l'anopheles maculipennis*," *Cont. rend. Soc. Biol.*, 1902, March.

[3] See Léger, L., "Sur quelques Cercomonadines nouvelles ou peu connues parasites de l'intestin des Insectes," in *Arch. f. Protist. Kunde*, 1903, vol. ii., p. 180.

LIVINGSTONE COLLEGE.

Commemoration Day Proceedings, June 9, 1904.

[We are indebted to Dr. Harford, Principal of Livingstone College, for the subjoined account.]

At the Commemoration Day Proceedings at Livingstone College, on June 9, about 200 visitors were present at the meeting in the garden, including among others Bishop Cassells, Drs. Symes Thompson, Heywood Smith, Wise, Coutts, Panting, Goldie, Soltau, Churchill and Watkins, Mr. and Mrs. R. L. Barclay, Mr. and Mrs. Eliot Howard, Mr. Travers Buxton, Mr. Henry Gurney, Mr. and Mrs. Andrew Johnston, Mrs. Alfred Buxton, Mr. Frank Wilson (Dr. Livingstone's son-in-law) and Captain Forbes, upon whose ship Dr. Livingstone had travelled.

After prayer by Bishop Cassells, the Principal, Dr. C. F. Harford made a statement concerning the progress of the College. He referred to the brilliant advances which had been made during the past year in the department of research in tropical medicine, which offered a steadily-growing argument in favour of the work of Livingstone College. He contended that the College played a humble but important part in the work of hygienic and sanitary reform, both by the missionaries trained within its walls—who are now scattered all over the world—and by the publications of the College, which circulate widely among European residents in tropical climates; and he specially drew attention to the new "Livingstone College Year Book," published that day, containing proofs of the value of the training received from students in

all parts of the world, and also including special hints on the "Preservation of Health in Tropical Climates," published for the first time in this year book. Livingstone College is endeavouring by every possible means to keep step with the progress of modern science by the purchase of suitable apparatus and by the equipment of a small laboratary, the opening of which by Professor G. Sims Woodhead, the chairman of the meeting, took place on Commemoration Day.

Changes had been made in the course of training during the past year so as to admit students for shorter periods of training than the full nine months, which is the length of the regular session. As yet many of the missionary societies did not realise the importance of medical training for their missionaries, but most of them were now giving special attention to the matter and hoped to make much more use in the future of Livingstone College.

The Treasurer, Mr. R. L. Barclay, gave a statement with regard to the financial position of the College. He referred to the gift of £4,000 which had been made during the past year by the Principal and Mrs. C. F. Harford, part of which was being devoted to taking over the mortgage on the property, the fund being placed in the hands of the trustees, and part being used for the equipment of the new laboratory and the purchase of apparatus, whilst it was hoped that a certain sum could also be used for the provision of better means of recreation for the students. It would be impossible, however, for this improvement to be carried out unless considerable donations—to the amount at least of £600—were made to prevent a deficiency on the year's accounts. The Committee earnestly hoped that this might be forthcoming, as they did not think the gift of the Principal should be devoted to current expenses, but rather should be applied to the purchase of apparatus, or the making of other improvements which would permanently benefit the College.

Professor Sims Woodhead, who presided, referred to the way in which Livingstone had revolutionised history, and thought it was very appropriate that the College should be called by his name, as he had himself realised the immense importance of medical knowledge in his work as a missionary. He (the Professor) held that it was the duty of every society to see to it that no one goes to the mission field who is not in some way prepared, at any rate by a short course of study, to take care of his or her own bodily health and the health of those dependent upon them; and he felt that the various missionary societies of this and other countries must be brought to feel that they have a very grave responsibility in this matter.

After referring to the death of Sir Henry Stanley, who had been closely associated with Livingstone's life and work, he quoted a saying of Dr. Livingstone's, to the effect that fever was the chief obstacle to the opening up of Africa, and it was his earnest desire that this should be removed in order that Africa might be opened up to Christianity and civilisation. The Professor, continuing, referred in cordial terms to the equipping of the new laboratory, which he declared open. He believed that it would be a great help to missionaries to have demonstrations showing them the micro-organisms which are the causes of disease, so that they may be able more easily to prevent them.

In conclusion, he appealed to the missionary societies to join together in supporting Livingstone College. He suggested that each society should make a certain contribution each year to the college, and for this sum have the privilege of sending a certain number of students. He believed that this would be a splendid way of spending the funds of the Society, and amply repay them by the results which would be obtained.

Three interesting testimonies were given as to the value of medical work in the mission field by Mr. William Pettigrew, of the American Baptist Missionary Union, from Assam; Mr. Bond, of the Wesleyan Missionary Society, from West Africa; and Mr. E. Dennis, of the Church Missionary Society, from the River Niger, students of the College.

Dr. William Wilson spoke as one who had been a missionary in Madagascar, and also the Secretary of the Friends' Foreign Missionary Society. He believed that even a little medical knowledge was of enormous value in dealing with the natives. It was also of the greatest importance for the sake of the missionaries themselves, who often have to meet great and grave risks, and do so without the slightest fear. He was of the opinion that a little knowledge of the means of preservation of the health would have saved many lives and averted a great deal of sickness. Sometimes when missionaries came home invalided they were accused of carelessness, but he believed that the blame lay chiefly with the missionary society that had sent them out without proper equipment as regards their health. He hoped that those present would make practical use of the afternoon's meeting by impressing upon the missionary boards and committees the extreme importance of equipping their missionaries with some medical knowledge. He considered that the nine months' course was all too short, and that missionaries should have the best training in this direction that it was possible to obtain.

Mr. Frank Wilson offered the concluding prayer, and Bishop Cassells pronounced the Benediction.

The guests afterwards had tea, inspected the College and the laboratory, and a demonstration with the new electric lantern concluded a most successful day.

Review.

A Revision of the Anophelinæ: being a First Supplement to the Second Edition of "A Handbook of the Gnats and Mosquitoes." By Lieut.-Col. G. M. Giles, M.B., F.R.C.S., I.M.S. (Retired). John Bale, Sons and Danielsson, Ltd. London: 83-89, Great Titchfield Street, London, W., 1904. Pp. 47. Price 2s. 6d. net.

The rapid advance of our knowledge of the *Culicidæ* necessitates frequent additions to our standard works on the subject. Colonel Giles' book has proved of infinite value to medical men and naturalists in all parts of the world and the present supplement will be welcomed. In the fresh list of the sub-family *Anophelinæ*, published in the supplement, the number

of names (not necessarily fresh species) are doubled since the second edition of his Handbook was published by Colonel Giles some two years ago. The entire classification of the *Anophelinæ* was remodelled by Mr. Theobald and described in the JOURNAL OF TROPICAL MEDICINE, June 16th, 1902, and this is now incorporated with the supplement just issued. Colonel Giles accepts Mr. Theobald's classification with Blanchard's modifications unreservedly, but casts some doubt upon the methods adopted and the conclusions come to by Dönitz. An excellent plate of nineteen carefully-drawn figures, in addition to several very useful and teaching diagrams, is issued with the present work. The supplement is quite up to the standard of Colonel Giles' work in previous editions of the Handbook, and higher praise it is impossible to bestow.

Notes and News.

THE medical establishment with the Thibet Mission consisted on April 3rd, 1904, of sixteen executive medical officers, thirty-one assistant surgeons and hospital assistants, and a large staff of nursing orderlies. The daily list of sick to date averaged 100 fighting men and 200 followers. Colonel L. A. Waddell, C.I.E., is the medical administrative officer of the force, and although the ambulance and hospital work has been excessive, the medical department has earned the highest praise for the efficiency of their department.

DESTRUCTION OF MOSQUITOES.—Sulphur burning has supplanted the pyrethrum burning in the destruction of mosquitoes in the United States.

PRESERVATION OF MUSEUM SPECIMENS.—As a means of preserving museum specimens, Dr. Hugh Galt recommends the following solution: common salt, 5 oz.; potassium nitrate, 1 oz.; chloral hydrate, 1 oz.; water, 100 oz. This solution is cheap, easily made from the salts, and preserves the colour of the specimen.—*Transactions Glasgow Medico-Chirurgical Society*, vol. iv.

SLEEPING SICKNESS—EXPEDITION TO THE CONGO. —The expedition sent to the Congo Free State at the request of the King of the Belgians, to study and report upon trypanosomiasis and sleeping sickness in that district, has evidently found ample material for investigation. The Commission, consisting of Doctors C. Christy, J. E. Dutton and J. L. Todd, left Britain early in September, 1903, and proceeded direct to Boma, where they remained some six weeks. Dr. Heiberg, a Belgian medical officer, joined the commission at Boma. The party then proceeded *via* Matadi to Leopoldsville, where provision was made for a careful study of trypanosomiasis and sleeping sickness. Dr. Christy left for Britain on May 1st, 1904, and brought with him three cases of sleeping sickness. The other members of the Commission when Dr. Christy left them proceeded higher up the Congo river, with the intention of further investigating trypanosomiasis. The report of this Commission ought to be of great interest, and the thanks of the scientific world are due to the King of the Belgians, Sir Alfred Jones, of Liverpool, and other generous supporters of the Liverpool School of Tropical Medicine, for their well-timed and philanthropic endeavours towards elucidating this scourge of Western Africa.

EMILE LEGRAIN.—In a work published in Paris (1904), entitled "*L'experiénce de Patrick Manson on la preuve expérimentale de la transmission de la "malaria" par le moustique*, Legrain attempts to "show up" the modern notions concerning malaria. According to this writer, every classical author's opinions concerning malaria undergo great changes every ten years. According to Legrain, "malaria is the theoretical consequence of theoretical ideas, changing with times, persons and countries." He contends that Torti, Maillot and subsequent observers, "have each created, microscope in hand, his own 'malaria,' for every poisoned sick person in his immediate environment has in his blood basophile corpuscles, which are looked upon as parasites." He casts doubt upon Manson's experiment demonstrating the possibility of transferring intermittent fever by mosquitoes, and considers Low and Sambon's stay in the Campagna in a gauze-protected house as a futile experiment. We cannot pursue Legrain's vagaries further, and although it may be well to have a drag on the wheel of too rapidly-advancing science, few would care for the unenviable position in this particular instance.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

China.

IN the China *Medical Missionary Journal* for April, 1904, there are but few references to local diseases. At Ichang in the province of Hupeh, on the Yang-tze-Kiang, 31° N, *malaria* is said to be very rife, owing to the ricefields in the neighbourhood, forming ideal breeding grounds for mosquitoes. *Leprosy* rare, during one year only one case seen and he was not a native of Ichang. Late *syphilitic* nerve lesions are remarked upon as being well-nigh unheard of; *locomotor ataxy* has not been seen at Ichang, and hospital reports from China pronounced this affection as one of the rarest amongst the Chinese.

In the Goodwin Hospital, under the M. E. Church South Mission, 13,567 patients were treated during the year 1903.

At Chang-to-fu Hospital, Houan, 3,946 patients were treated in thirteen months; of these 25 per cent. were women. During this period 177 operations were performed; these included 86 operations on the eye, 27 being for cataract; 7 operations were for hare-lip.

Rio de Janeiro, Brazil.

Long., 43° W., lat., 22·5 N.; population, 850,000.

In Rio, from January 1st to May 8th, 1904, the mortality from the principal diseases was as follows: Beri-beri, 53; whooping cough, 10; cholera (Asiatic) 0; diphtheria and croup, 18; dysentery, 11; influenza, 117; leprosy, 7; malarial affections, 198; malignant diseases, 76; measles, 17; plague, 40; scarlet fever, 2; small-pox, 542; tuberculosis, preliminary, 887; tuberculosis, general, 78; typhoid, 34; yellow fever, 27.

Cholera.

India.—In Calcutta during the week ending March, there were 58 deaths from cholera; in Karachi 1 death, and in Madras 23 deaths from the disease.

Philippines.—In Manila during the week ending March 5th, 1 death from cholera; in the provinces 32 cases and 20 deaths.

Persia.—In the *British Medical Journal* of May 14th, 1904, cholera is reported to be present in the provinces of Kermanshah, Persia. At the time of writing, presumably April, 1904, as many as 35 cases were recorded, with 26 deaths from the disease.

Leprosy.

New South Wales.—On January 1st, 1903, there were 10 persons in the leper lazaret, against 14 on January 1st, 1902.

Plague.

PREVALENCE OF THE DISEASE.

Formosa.—During March, 1904, there were 558 cases of plague reported in Formosa, with 369 deaths from the disease.

Peru.—Outbreaks of plague are reported from Lima and Callao; the disease has occurred in the most densely populated parts of the cities. All cases of plague are removed to special hospitals.

India.—During the weeks ending May 7th, 14th, and 21st, the deaths frem plague numbered 41,607, 35,413, and 35,000 respectively.

Aden.—Three cases reported on May 15th.

South Africa: Cape Colony.—At Port Elizabeth, during the weeks ending May 14th and 21st, the fresh cases numbered 1 and 2, and the deaths from the disease 0 and 1.

Transvaal.—During the weeks ending May 28th and May 4th, there were reported 5 and 2 fresh cases, and deaths 3 and 1, respectively.

Mauritius.—During the weeks ending June 2nd and 9th, fresh cases 3 and 0, deaths 2 and 0.

Hong Kong.—During the weeks ending May 28th and June 6th, fresh cases 27 and 36, deaths 27 and 37.

Queensland.—One case reported, April 8th.

Peru.—On June 10th, 10 persons died of plague at Payta.

Yellow Fever.

Brazil.—In Rio de Janeiro, during the weeks ending March 20th and 27th, the fresh cases numbered 6 and the deaths from the disease 3.

Columbia.—In Barranquilia, between March 23rd and April 3rd, there were no fresh cases of yellow fever and 1 death from the disease.

Ecuador.—In Guayaquil, during the week ending March 26th, there were no fresh cases and 10 deaths.

Mexico.—In Merida, on April 3rd, there were 3 fresh cases and 2 deaths.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Ankylostomiasis.

CHRONNELL, J. Ankylostomiasis. Abstract of Paper, read April 14, 1904. *The Lancet*, May 21.—Chronnell draws attention to the presence of ankylostomiasis in English mines. Amongst the signs and symptoms of the disease he mentions that in Cornwall an irritable, pustular skin eruption, locally known as "bunches," has been found. The anæmia in this disease has been shown by Boycott and Haldane to be due to the increase of the total volume of the blood, causing the dilution of the hæmoglobin. Deficient aeration of the blood is the result, accompanied by all the concomitant symptoms.

Chronnel recommends greater cleanliness of the hands and skin generally amongst miners, and advocates provision of lavatory buckets, baths, and a supply of fresh water for the men whilst working in the pits.

LOOSS, A. Zum Bau des erwachsenen ancylostomum duodenale (The Structure of the Adult Ankylostomum). *Centralblatt f. Bakteriologie*, Jena, 1904, vol. xxxv., No. 6.

NICHOLS, H. G., and WAINWRIGHT, J. M. Hookworm Disease and Miner's Anæmia in the Anthracite Coalfields. *Medical News*, April 28, 1904.—This is a report upon the examination of 400 miners from some fifteen mines, including all nationalities. In only one case was the parasite found.

Ascaris Lumbricoides.

KERMORGUNT. Observations on the *Ascaris lumbricoides. Bulletin de l'Acadmie de Médecine*, Paris, 1904, vol. lxviii., No. 16.—The author draws attention to the many complications caused by the roundworm in tropical countries. Febrile conditions, inflammatory conditions of the intestines and biliary passages, and many vaguely defined symptoms are some of the complications mentioned.

SCHUPPER F. A Case of Hepatic Lumbricosis. *Gazzetta degli Ospedali e delle Cliniche*, March 6, 1904.—In a patient who suffered from epileptic attacks, emaciation and fever before death, Schupper found after death round-worms in the gall-bladder and the biliary ducts. The bile ducts were so widely distended that the round-worms failed to block the passages, hence the absence of jaundice during life.

Cholera.

KRAUS, R. Differentiation of Cholera Vibrio. *Wiener Klinische Wochenschrift*, vol. xvi., No. 50.—Kraus

points out that the cholera vibrio does not produce hæmolysins, whereas all other allied vibriones do.

Delhi Sore.

CAPT. S. P. JAMES is reported to have found in cases of Delhi sore parasitic bodies apparently identical with the Leishman-Donovan bodies.

Distoma Westermanii.

MACKENZIE, A. D. A Case of Parasitic Hæmoptysis, or Infection with the *Distoma Westermanii. Journal of the American Medical Association*, April 30, 1904.—This is the first recorded case of parasitic hæmoptysis recorded in America. The patient in whom the ova of the distoma were found was a Japanese.

Dysentery.

HASTINGS, R. W. A Clinical Study of *Bacillus Dysenteriæ* in Boston (U.S.A.) and Vicinity. *Journal of the American Medical Association*, April 30, 1904.

Dysentery—Amœbic.

MORGENROTH. Ueber Ruhreintersuchungen in China. *Archiv. für Schiffs und Tropen-Hygiene*, January, 1904.—Morgenroth, whilst in China in 1901, only occasionally found amœbæ in the stools of dysenteric patients. During certain seasons, and even certain years, amœbæ are entirely absent from dysenteric stools, and during other periods the amœbæ are invariably present.

Morgenroth believes liver abscesses occur independently of the presence of amœbæ. He considers that liver abscesses occur more frequently in connection with Flexner's than with Shiga's bacillus, which he regards as distinct varieties.

BARBAT, J. H. Surgical Treatment of Chronic Dysentery. *American Practitioner and News*, April 15, 1904.—Barbat, from experience gained in Manila, is of opinion that chronic dysentery of the amœbic type is difficult to cure by medicinal treatment and advocates a colostomy as a cure. In one case, after closure of the artificial anus, Barbat states that the patient became dissipated and developed a liver abscess.

Hæmoglobinuria in Cattle.

DJATSCHENKO, E. Erreger der toxämischen Hämoglobinuric bei dem Vich in Kuban (The Cause of Toxæmic Hæmoglobinuria in Cuban Cattle). *Centralblatt f. Bakteriologie*, Jena, 1904, vol. xxxv., No. 6.

Leprosy.

KEDROWSKI, W. T. Experimentelle Erfahrungen über Lepraimfungen bei Tieren (Experimental Inoculation of Animals with Leprosy). *Centrablatt für Bakterologie*, Jena, vol. xxxv., No. 3.

NEISH, W. D., and TONKIN, T. J. Leprosy in Jamaica. *Bristol Medico-Chirurgical Journal*, March, 1904.—Leprosy occurs, according to Neish and Tonkin, in those parts of the world where a food deficient in nitrogen is consumed. Improved diet in Jamaica would appear to have reduced the lepers during the past forty years from 800 to 300, although the population during the period has well-nigh doubled.

The treatment adopted by these observers consists of hydrargyri perchloridi, gr. $\frac{1}{4}$; sodii chloridi, gr. $\frac{1}{4}$; aquæ destil., min. xx. The solution is injected into the muscles of the buttock or back twice weekly through a hypodermic syringe with a platinum or iridium needle. The only drawback to this treatment is that pain is produced for two or three hours and the induration left by the injection does not disappear for a week. General hygienic measures and recreation of all sorts are necessary adjuncts to treatment.

ROST, E. R. The Cultivation of the *Bacillus lepræ. Indian Medical Gazette*, May, 1904.—Rost states that there is a class of bacteria which may be termed the a-chloretic, and of this acid-fast group the *Bacillus tuberculosis*, the *B. lepræ* and the *B. Lustgarten* are pathogenic. Finding the acid-fast bacteria would not grow in the presence of the salts of chlorine, Rost proceeded to extract the chlorides from the nutritive media. He used as media (1) a distilled beef extract which gave a clear fluid smelling strongly of beef; (2) a nutrient agar, dialysed by passing through an animal membrane in hot distilled water for some days; (3) a dialysed fish broth. In these media the *B. lepræ* grew readily, over 300 cultivations having been made. Rost next proceeded to produce a leprolin, on the lines of Koch's tuberculin, as follows: Cultivations of leprosy in the distilled beef extract (improved by the passage of superheated steam over the boiling extract) were allowed to grow at a temperature of 37° C. for six weeks, and then sterilised and passed through a Pasteur filter, when glycerine is added to the clear fluid. Leprolin, as prepared by Rost, has been injected in eleven cases of leprosy, when symptoms similar to those caused by Koch's tuberculin ensued, with in several cases marked improvement.

Rost hesitates to pronounce the ultimate effect of his leprolin, but he will forward his preparation to any one wishing to try the leprolin in cases of leprosy.

Liver Abscess.

KOCH, J. A. Ueber tropische Leber Abszesse (Tropical Liver Abscess). *Mitteilungen a. d. Grenzgebieten*, Jena, vol. xiii., No. 1.—Koch relates sixteen cases of liver abscess and their treatment. He advocates early operation.

PEL, P. K. Tardive Leber-Abscesse nach tropischer Dysenterie (Tardy Liver Abscess after Dysentery). *Berliner Klinische Wochenschrift*, vol. xli., No. 14.—Pel relates a case of liver abscess occurring in a patient who had suffered from dysentery twenty years previously. The patient had resided in a temperate climate twenty years subsequent to the attack of dysentery.

Malaria.

FOREL, A. Zur Malaria-Frage (Malaria Prevention). *Münchener medicinische Wochenschrift*, vol. li., No. 13.—Forel suggests an experimental test of various kinds of drugs and substances calculated to drive away or kill mosquitoes by their smell. The experiment might be carried out by covering an exposed limb with some substance to be tested in this direction, whilst the rest of the body is covered by a mosquito net.

JANCSO, W. Accidental and Experimental Inoculation of Malaria. *Deutche Archiv. für Klinische Medizin.*—In Klausenburg University Hospital, Tran-

sylvania, Austro-Hungary, a number of *Anopheles claviger* mosquitoes, after being allowed to feed from a woman suffering from malignant tertian ague, escaped from the incubator in which they were caged. Within a period of thirteen days nine cases of malaria occurred among the residents and inmates in the hospital. The fact that the accident occurred during the winter months, when no fresh infections are possible in Klausenburg; that the persons who developed the disease were all within the hospital compound; that the parasites in the original case, in the mosquito and in the blood of those bitten were the same, all serve to show that the infection was conveyed by the infected mosquitoes escaping from the incubator.

Malta Fever.

KONRICH, F. Agglutination of the *Micrococcus melitensis*. *Wiener Klinische Wochenschrift*, vol. xlvi., Heft. i.—Konrich, from his observations, concludes (1) that the normal sera have little or no influence in the agglutination of the *M. melitensis*; and (2) that many normal sera of human beings agglutinate it in a dilution of 1 in 500. It would therefore appear that the agglutination test for Malta fever must be accepted with reserve.

Piroplasmosis.

JENNINGS, E., and LINGARD, A. A Preliminary Note on Piroplasmosis found in Man and in Some of the Lower Animals. *Indian Medical Gazette*, May, 1904.—According to Lingard and Jennings, hæmoglobinuria of cattle, due to the presence of *Piroplasma bigeminum*, made its appearance in 1902 amongst cattle in Bareilly, India, after the subcutaneous inoculation of rinderpest blood. The animals in which spontaneous piroplasmosis was found in Bareilly were: (1) Bovines, plains and hill animals; (2) buffaloes; (3) equines, English, Australian, Arab, country-bred horses, "tatoos" and donkeys; (4) elephants; (5) camels; (6) goats and kids; (7) sheep; (8) dogs, English and pariahs; (9) cats, tame and wild; (10) monkeys; (11) deer, several species; (12) British breed of fowls. The authors remark that "it would appear probable that man and animals alike in certain seasons may all present the same species of piroplasma, but modifications in the specific characters of the hæmatozoon are developed during the passage through the different animals." Ticks have been proved (Smith, Kilbourne and Koch) the better means of carrying piroplasma from one animal to the other, but as this mode of transmission occurs only exceptionally in man, the authors have "naturally turned to the *Culicidæ* and the biting forms of the *Diptera*," and the Culex, not the Anopheles, is held to be the medium of infection. In the blood of one man benign tertian malaria parasites were found along with the piroplasma. The patient suffered from a remittent type of fever, together with intermittent attacks of hæmoglobinuria. The symptoms of piroplasmosis in man are stated to be anæmia and cachexia, a normal or subnormal morning temperature, with an evening rise to 99° or 100° F., with general malaise and sweating on the slightest exertion. Slight yellowness of conjunctivæ is noted at times. The urine in severe cases has a smoky tint, and red corpuscles are present in the urine, or hæmoglobinuria is present alone. Liver and spleen generally normal The organisms invading the blood corpuscles are non-pigmented. The undulant character of the temperature is notable. Lizards were found during the cold season to be free from piroplasma parasites, but as soon as the mosquitoes appeared examination of the blood of the lizards showed the presence of the parasite. The authors describe the formation of the zygote and the appearances presented by the macrogametes and microgametes, and state that the development of the piroplasma in the tick appears to be analogous to that in the mosquito. In mammals, including man, the development of the piroplasma is of the asexual variety; in the lizard, however, the sexual and asexual developments proceed concurrently.

The authors state that their publication is merely preliminary, and maintain that "the unification or differentiation of the organism observed in various animals must engage attention in the near future." By a coloured plate the authors give illustrations of piroplasma found in several animals.

Plague.

KLEIN, E. Experiments in Disinfection of *Bacillus pestis* with Cyllin, Absolute Phenol and Formalin. *Public Health*, London, June, 1904.—The relative action of the several disinfectants named on *B. pestis* of a virulent strain were tested by Klein, with the following results: Formalin even 1 in 30 failed to disinfect *B. pestis* in fifteen minutes; Phenol 1 in 80 failed to disinfect *B. Pestis* in five minutes, but did disinfect in ten minutes; and Cyllin 1 in 2,400 failed in five minutes, but succeeded in ten minutes.

Appointments, Change of Station, Leave, &c.

Medical men in practice abroad would find it convenient to send intimation of their movements to appear in this column; also their addresses when in Great Britain.

DR. A. A. M'DONALD has been appointed a Stipendiary Magistrate of Newfoundland, in succession to the late Mr. P. Sullivan.

THE appointment of Surgeon-General of British Guiana has become vacant owing to the death of Sir David Palmer Ross, which occurred at Georgetown after a long illness. Sir David entered the Colonial Civil Service thirty-eight years ago as a medical officer in Jamaica, and after reaching the position of senior medical officer in that colony became Colonial Surgeon of Sierra Leone in 1885. He was promoted to the office of Surgeon-General of British Guiana in 1894, and was to have retired on a pension in August next.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

CALABAR SWELLING AND ITS RELATIONSHIP TO FILARIA LOA AND DIURNA.

By T. S. Kerr, M.B., C.M.

Literature on the subject of Calabar swellings is scanty, the only recent papers I can find being one by Sir Patrick Manson, in the Journal of Tropical Medicine of November 16th, 1903, p. 347, and another by Dr. Habershon, in that of January 1st, 1904.

In his article Sir Patrick Manson records eight cases of the disease amongst missionaries on the Upper Congo, two of whom had been under his personal care. He describes the transient character of these swellings, their recurrence at uncertain intervals, irregular distribution, and association with *Filaria loa*, and conjectures that they may be due to the parturition of *Filaria loa*, the presumed parental form of *Filaria diurna*.

In the article by Dr. Habershon, including a letter by Dr. Argyle Robertson, the latter states as his conviction that these swellings are due to the irritation caused by the presence of *Filaria loa*.

Notes of the following case, recently sent by Dr. Habershon to Sir Patrick Manson, in conjunction with three other cases sent, one by Dr. Wurtz, of Paris, the others by Dr. Hanley, of Old Calabar, seem to support the hypothesis of the causation of these swellings conjectured by Sir Patrick Manson.

Date	Time	Filaria Count	Time	Filaria Count	Remarks
Jan. 21	Noon	47	10 p.m.	0	—
,, 22	2 p.m.	33	,,	0	—
,, 23	Noon	66	,,	3	—
,, 24	1.30 p.m.	20	,,	0	—
,, 25	1 p.m.	103	—	—	—
,, 26	,,	47	11 p.m.	0	—
,, 27	Noon	44	10 p.m.	4	—
,, 28	,,	22	10.45 p.m.	0	Swelling appeared on left wrist about 9.30 p.m. Blood for evening of that day was taken from wrist in vicinity of swelling.
,, 29	,,	—	11 p.m.	0	The film for noon was juice of swelling extracted by hypodermic puncture, which was negative.
,, 30	,,	19	10 p.m.	0	—
,, 31	,,	36	,,	0	—
Feb. 1	,,	60	,,	0	
,, 2	—	—	—	—	Another swelling near left elbow.
,, 3	3 p.m.	19	10 p.m.	0	—
,, 4	Noon	—	,,	0	Film spoiled.
,, 5	,,	16	,,	0	
Mar. 26	,,	50	,,	1	
April 13	,,	84	,,	0	
May 7	3 p.m.	16	—	—	

For the evening of January 25th, morning and evening of February 2nd, and evening of May 7th, no films were sent.

There was necessarily some variation in the size of the films, but on the whole the noon and evening variation may be disregarded.

The Rev. S. O. K., from Yakusu, on the Upper Congo, where he had been stationed for three years, arrived in England in January, and was first seen by me on January 18th. He complained of recurring localised swellings, chiefly about the left forearm; these first appeared after twelve months' residence at Yakusu, but beyond the local discomfort, viz., shooting pains in arm and shoulder, with swelling and tenderness of the axillary glands, his health did not suffer. Has had in all about twenty swellings, generally on the forearm, or occasionally on the leg, and once or twice on the chest. Has had no fever.

A blood examination made during the day on the 18th showed the presence in the blood of embryo filariæ in considerable numbers.

From January 21st to February 5th blood films were taken daily by the patient, one about noon and the other at 10 p.m. The record shows that at noon embryos in large numbers were always present, varying from 16 to 103 per slide, whilst of the films taken at 10 p.m. only two were found to contain embryos —3 and 4 respectively. The diurnal periodicity was therefore well marked, and would serve to indicate that the infection was one of *Filaria diurna*.

Subsequent examinations on March 26th and April 13th, at noon, gave 50 and 84 for the mid-day count, and 1 and 0 for the 10 p.m. count, respectively; a count at 3 p.m. on May 7th gave 16.

Since first seen he has had five recurrences of these swellings, viz., January 28th, February 2nd, two during March, April, and on May 6th.

The notes of a case supplied by Dr. Wurtz, of Paris, are as follows: A lady, after four years' residence in French Congo became affected with painful localised œdemas of both hands and wrists, occasionally of legs, associated with some rigidity and loss of power. The condition was at first thought to be rheumatic, but later a white worm about the size and length of an ordinary pin was seen beneath the ocular conjunctiva, reappearing later beneath the skin of the eyelids of both eyes, of both forearms, and finally under the frænum of the tongue.

In one of Dr. Hanley's cases, a European, who suffered from these transient swellings, there was also a *Filaria loa* present, and in the blood numerous embryo filariæ which cannot be distinguished from *Filaria diurna*. From the other case, a native, a *Filaria loa* was removed, and it was found to be full of sheathed embryos indistinguishable from *Filaria diurna*, which were also found in the blood. No mention is made of swellings in this case.

In the case of Mr. K., there were Calabar swellings and a pronounced infection of *Filaria diurna*. In Dr. Wurtz' case there were Calabar swellings, associated with *Filaria loa*. In one of Dr. Hanley's cases there were Calabar swellings associated with both the presence of *Filaria loa* and an infection of *Filaria diurna*. In the other there were found in the *Filaria loa* itself embryos sheathed and indistinguishable from *Filaria diurna*, associated with an infection of *Filaria diurna*.

The evidence now accumulated warrants, I think, the conclusion that these swellings are due to the presence in the tissues of *Filaria loa*, and the cases cited, that this nematode is the parental form of *Filaria diurna*.

The periodic recurrence of these swellings supports,

I think, Sir Patrick Manson's conjecture that they are provoked by the discharge into the connective tissue of her embryos by a parental loa.

Since writing the above, a paper by Dr. Brumpt, of Paris, which was read at the meeting of the Biological Society on April 16th, has just been received, in which, from observations on a case under his care, he arrives at the same conclusion.

ARSENIC IN THE TREATMENT OF TRYPANOSOMIASIS IN CATTLE IN NIGERIA.

By Charles R. Chichester, M.B.
Asaba Forcados, Southern Nigeria.

The following was addressed in the form of a letter, dated May 5, 1904, *to Sir Patrick Manson.*

It will interest you to read of experiments which I have carried out here with cattle suffering from fly disease. It will also be satisfactory to you to know that had it not been for my course at the Tropical School, the disease they were suffering from would not have been diagnosed, and all the cattle would have died "because the country did not suit them." I came here in the middle of February, and soon after my arrival went to see an official who was in charge of a coffee plantation and who had under his care cattle that had been imported from the West Indies, with a view to providing an improved and a milking breed. These cattle had only arrived a short time previously and had contracted some peculiar disease that was carrying them off one after another. When I saw them they were all, or nearly all, apparently ill. Fever, loose teeth, loss of appetite, a great decrease in milk, emaciation, were the chief symptoms. In my mind the thought at once arose, is this trypanosoma? As soon as I had unpacked my microscope I returned there and had no difficulty in finding trypanosomes, and in large numbers in some cases. For treatment I determined to try arsenic and salol. The latter I soon gave up as useless. The former seemed to do some good, but not much, as far as trypanosomes were concerned; but apparently in those who were still feeding appeared to upset their appetites. Drugs ran out, the disease pursued its course, and the cattle died, till but seven out of twenty were left. Then we got more drugs and, on the advice of Dr. Moore, a medical officer in this Protectorate, determined to try arsenic hypodermically. We gave huge doses, as much as $4\frac{1}{2}$ grains of arsenious acid being injected at one time (an acid treated with nit. acid and then rendered alkaline with sod. bicarb.). One injection per diem for three days was given. The result has been wonderful. Within forty-eight hours the animals began to mend in every way. Appetite returned, fever left, and milk was much increased in quantity. The trypanosomes which had been so numerous were difficult to find, and now are not to be found. The animals seem in good health again. Whether this will continue or not remains to be seen. It is now three months since we started treatment, and about two since hypodermic injections were given. From faulty technique abscess resulted from the injections, but that is so no longer. It was interesting to note that two of the cows presented typical symptoms of sleeping sickness, waking up for food or when called loudly, and then falling to sleep at once. From time to time arsenic is still injected in those apparently well, but it is intended to cease giving it as soon as some enlarged glands which appear in both neck and groin in all cases have ceased to be manifest. These are rapidly going down. My work here is very heavy and unfortunately I cannot often see the cattle. Once a week, sometimes only once in three weeks, can I go over to see them. But the officer in charge, a Mr. Young, takes the greatest care of them and carries out the advice I give him very faithfully; and I manage to get over often enough to be able to note the great improvement that is taking place. Apparently native cattle are immune, but I have not been able to go into the question as to whether trypanosomes are in their blood or not. Horses are not immune. I have not heard of arsenic having been tried hypodermically and consequently write to let you know of its effect here.

The experiment is not over, but I do not think it wise to wait longer. I tell you what I have found and you may perhaps think it wise to ask others to try the same treatment, especially in those parts where it seems such a scourge to human beings.

SCARLET FEVER IN THE TROPICS.

By Alfred L. Wyeham.
St. John's, Antigua, West Indies.

This communication was addressed to Sir Patrick Manson, who adds that "The following are examples of scarlet fever in the West Indies. There, as elsewhere in the Tropics, the disease does not spread if introduced into families or communities."

(1) A West Indian lady, white, of well-known reliability, told me about two months ago, unsolicited, that when she was a girl she suffered from a fever that the family doctor gave the name of scarlet fever.

I should mention that the doctor referred to was a man of high standing in his profession in these parts, whose descendants are doctors to-day and are practising in England, and that this diagnosis must have been made at least sixty years ago.

(2) In April, 1894, I saw a case in my own practice in a well-grown (white) Portuguese girl. The condition of the tongue and throat was typical, as well as the desquamation that followed. I was unable to satisfy myself as to the origin of the case. The disease did not go beyond this individual case, although the household consisted of a goodly number, rendering isolation impossible.

(3) In August, 1897, I saw another case. This riveted my attention, because it was in a young adult negress. The tongue and throat symptoms were typical and redness over the body was well marked, the portion of the body protected by clothing appeared distinctly scarlet. I attended the patient to the end of the illness. She desquamated very thoroughly, especially as to her hands and feet. Neither in the same house nor in the neighbourhood was another

case of the kind observed so far as I could find out.

(4) In October, 1897, I was called to a case in a family under my care at a distance of about three miles from town, St. John's, going eastward. The patient was a boy of about 8 or 9 years of age. He had fever, sore throat and "strawberry" tongue; the skin, which was light brown colour, was merely flushed. I treated the case, which seemed to respond, so that in about two weeks the patient seemed markedly better, desquamating slightly. About a week later it was reported to me that the little boy's feet and legs and abdomen were swollen. On examining the urine, albumen was found in large quantity. At the end of three months from the beginning of the illness the little fellow showed signs of real improvement that remained permanent; he is alive, well-grown and strong to-day.

(5) I had been told up to the time that I first saw a case that scarlet fever was not seen in the West Indies, and I was strongly inclined to show the first case to another medical man in order to confirm the diagnosis, but refrained from doing so. When, however, the case (No. 4) presented itself, I at once submitted it to the resident surgeon at the hospital at the time, who decided without hesitation that the disease was scarlatina. This surgeon is still in His Majesty's service on the staff of one of the large English prisons.

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A CASE OF FILARIASIS AT FEZ, MOROCCO.

By E. S. Verdon, M.D.

Physician to the Court of H.S.M. The Sultan of Morocco.

During the second week in March a soldier came to me complaining of "esshrub," *i.e.*, scabies, which is very common in Morocco. He had papules on the front and back of wrists and between the fingers. He said the constant irritation prevented his sleeping. I gave him some sulphur and mercury ointment, with instructions to take baths and wash his clothing.

On March 25th I was asked to see the man, who was confined to his quarters with fever. He had had a rigor, and his temperature was 102°; there was a diffuse redness, spreading from the inguinal regions upwards over the lower third of the abdomen and downwards over the thighs. The inguinal glands were swollen, hard and tender; on the buttocks was a raw patch, with exudation due to the constant scratching. It appeared to be a case of lymphangitis due to infection from the parts affected with scabies.

History.—Ci Abes is a native of Rahamna, a district in the west of Morocco, within easy reach by the north-west road. He is a healthy-looking man of about 30, brown in colour, with the small head and features of the Berber, the indigenous race of Morocco, who owned the country before the Arab invasion. During the last three years he has resided in Algeria, one of the soldiers in attendance on the mission sent to define the frontier. He has had acquired syphilis and several attacks of malaria; there is no enlargement of the spleen. A year ago in Algeria he had a similar attack of fever; the skin over the entire body became red, there were swellings in the glandular regions, his face and limbs were much swollen, and fluid exuded from his skin. This illness lasted six weeks. Four months ago a second similar attack occurred in Algiers, and he was admitted into a French hospital. The same symptoms occurred as in the previous illness. His blood was examined, he tells me, and he was given a hypodermic injection (probably of anti-streptococcus serum), which cut short the attack, the duration of which was only ten days.

March 27.—He is much worse, has had several severe rigors, the post-cervical glands on the right side are swollen and very tender. His skin, always dark, is now dusky red, the face flushed and puffy, the inguinal glands are large, and a cord of swollen lymphatics can be felt in the inguinal regions. The axillary glands are also swollen and tender. He has had no vomiting, but the tongue is furred, the pulse rapid, and temperature 103°, and he complains greatly of the irritation and tenderness of his skin. I took a specimen of the blood from a finger at 7 p.m., but found nothing abnormal.

March 28.—Patient appears worse, has had a rigor and complains of some headache. He is dull and heavy, the face flushed and much swollen, the right eye almost closed, a yellow purulent exudation (as in acute conjunctivitis) from both eyes. The cervical, axillary, inguinal glands all much swollen; there is a clear exudative like serum from the genital and umbilical regions. His appearance is that of a general lymphangitis of the body and erysipelas of the face.

As I was unable to see the patient late at night, an Algerian took some specimens of the blood at midnight. I stained the ten slides sent with a solution of carbo-fuscin (one drop to the ounce), leaving the slides in the stain one hour and a half. Examination with a low power showed numerous filaria of very varying length, with a $\frac{1}{6}$ power they appear to be *Filaria nocturna*, the tail ending fairly sharply, the head forming sometimes a single tapering projection, at others a blunt extremity surrounded by minute filaments; the bodies are transversely striated. They vary much more in length than those pictured in Sir Patrick Manson's article in Davidson's "Hygiene and Diseases of Warm Climates"; numerous chains of streptococci were also present.

March 29.—The patient's face was much swollen and covered with yellow crusts, clear lymph-like fluid was exuding from the umbilicus, about groins and perineum. On the lower third of abdomen and on the limbs are numerous yellow pustules, which when pricked exude yellowish fluid, clearer than ordinary pus; these pustules are very thick over the lower part of abdomen.

March 30.—Patient was much better, and from that date rapidly improved. For about fourteen days the glands in the axillæ and inguinal regions were enlarged and tender, and later an abscess formed in each axilla, otherwise he had no further trouble.

Patient had fever during eight days in all. A w[illegible] after the fever left him I again examined the blo[illegible] taken at midnight and found numerous filaria. I [illegible] examined the pus from the abscesses opened, but without finding filaria.

The above case is the first one in which I have

detected filaria in Morocco. At Fey, *Elephantiasis arabum* is not common, I have seen one case in two years and a half. At Marrakesh (Morocco city), the southern capital, it is fairly common, and in the Sūs, a province in the far south, I am told that it is very common; all the cases I have seen have had elephantiasis of one or both *lower* extremities. Elephantiasis is very common at Salee, an ancient town on the north coast, close to Rahar. Salee and Rahar are situated one on each side of the Rahar river, not half a mile distant from each other. Dr. Kerr, who practises at Rahar, tells me that there are very few cases of elephantiasis at Rahar, whereas at Salee it is so common that the disease is known as "Salee thick leg"; inland I have heard people called "Sons of Salee" when suffering from elephantiasis. Dr. Kerr notes that the arms are much less commonly affected than the legs, that nearly all cases commence like erysipelas, and the disease is not communicated to the children. After many years at Rahar he has formed the opinion that the disease is caused by contaminated water; to quote from his notes: (*a*) It is confined to the Moorish quarter, only one or two cases in the Jews' quarter; (*b*) there is no drainage in the Moorish quarter, only cess-pools in the centre of the courts; the Jews have fairly good drainage and no cess-pools; (*c*) the Jews obtain their water from a good source, the Moors from wells in their quarter, most of which are contaminated with sewage from the cess-pools. Dr. Kerr adds that elephantiasis is not known in Azemoor and the Gharb, provinces adjacent to the towns of Salee and Rahar.

TRYPANOSOMIASIS IN MAN.

By Guy R. Ruata, M.D.Turin.
Of the London School of Tropical Medicine.

(*Continued from p.* 186.)

Latency.

A very significant fact of the lethargy is its prolonged latency, lasting, it may be, for years; so, although it can be acquired in certain places only, the outbreak of the symptoms can appear in another country with a totally different climate, and after several years of healthy residence there ultimately cause the death of the patient. This happened in many cases of Africans landed in the West Indies, and even in Europeans coming to England from Africa. The Negroes state that no one is safe from lethargy until seven years have elapsed after leaving an infected district.

Dr. Christy says that the incubation period may be as short as eight months or as long as eighteen months. Towards the termination of the incubation period the patient becomes listless and melancholic, passive and indifferent, always complaining of frontal or occipital headache. This is often the most distressing symptom to the patient; vague pains in the chest, loss of appetite, increasing weakness of the limbs, giddiness, evanescent flashes of fever, liability to constipation or to diarrhœa.

Sometimes the invasion of the disease begins with cerebral excitement or mania, or with delirium of furious type, at other times with homicidal tendencies; in Kavirondo, Christy observed, in a violent excitement of a native, a state of tense priapism.

The symptoms increase very insidiously for many weeks or months. By degrees the mental attitude slightly changes, the facial aspect becomes dull, stupid, heavy and apathetic. The patient becomes easily fatigued at his work, and always seems glad to sit or lie down, lies longer in bed in the morning; the drowsy stage advances so that the patient falls asleep while he is eating or speaking or at work.

The overpowering lassitude is the most remarkable symptom, and declares itself in the slowness in answering questions, in mumbling speech, in a peculiar sluggish, staggering gait. By and by the patient becomes more taciturn and seeks to seclude himself in order to sleep. Notwithstanding, when obliged to answer or to speak, he may do it intelligently but slowly. In the morning, owing to the temperature being subnormal, the patient is often found lying in the sun or on the hot earth. The memory does not seem to be affected. The will power and the attention become less with the increase of the disease. Choreiform movements occur, noted in the tongue, face, arms and hands. The temperature is always raised in the evening, 101° to 102°, falling to subnormal in the morning. Diminution of the arterial tension is constant. The pulse, normal in the beginning, becomes irregular in the advanced stages, and becomes arythmic and thready; frequency, 90 to 130. In many cases the tongue is swollen and protruded, and the eyeballs prominent, as in Basedow's disease.

The sensory functions are at first normal, or there may be hyperæsthesia at points of emergence of trigeminal nerve. The muscular sense or conscious movement is conserved. The Portuguese Commission found a diminution of Faradic sensibility in the anterior tibial muscles and the biceps of the arms. No alteration in hearing, taste, or smell. The reflex sensibility, both superficial and deep, is increased. In the ultimate phases the reflex sensibility is suppressed. Argyll-Robertson's pupil has not been observed, but in a few cases Romberg's and Babinsky's signs have been met with. With the aggravation of the disease the general myasthenia reaches such a degree as to preclude the possibility of standing. A constant symptom is the intense pruritus, due to a papulo-vesicular eruption, especially marked on the trunk. The soft, glossy skin of the healthy young Negro becomes dry, lustreless and scurfy.

A symptom which particularly attracted the attention of all the observers is the enlargement of the lymphatics, especially of the cervical glands; often other groups of the deep (mediastinal and mesenteric) and superficial glands are swollen; these do not suppurate. Attention has been drawn to enlarged glands in most descriptions, but on examination of the general population the glands are often symmetrically enlarged. Dr. Christy, who paid particular attention to this point in Equatorial East Africa, concludes there would appear to be "no further connection between sleeping sickness and enlargement of glands, for although the majority of cases of the former had firm and freely movable glandular enlargements in the neck, and some of them all the superficial glands

in the body enlarged, yet there were many cases with no enlarged glands whatever."

In the course of the stage of lethargy *acute* and *chronic* symptoms may develop.

Acute Form of Lethargy.

In the acute form the tremors are marked, especially in the tongue and the muscles of the hand. The deep, continuous lethargy increases; the patient forgets even to chew his food; the emaciation and general weakness become pronounced. Knee-jerks, at first exaggerated, become diminished. Incontinence of urine and fæces and dribbling of saliva may be present. The patient is eventually confined to bed. The drowsiness, gradually increasing, passes on to coma. The temperature falls generally to subnormal. The patient becomes cold, and dies in a state of complete coma.

Chronic Form of Lethargy.

In the chronic form of lethargy the symptoms may continue for perhaps several months without any new alarming symptoms. The drowsiness becomes gradually more marked. As in general paralysis of insane, intelligence seems sometimes to return, but it is a deceitful improvement, and sooner or later the lethargy returns and overcomes the will power completely. The face and the body look puffy, the lower lip swollen and drooping, the speech husky, the tremors in the muscles become more marked, especially in the arms, hands and legs; sometimes choreiform convulsions, followed by contraction or paralysis limited to one part of the body or to one limb; now and then a paraplegic attack ensues.

The temperature is 102° to 103° F. at night, normal or subnormal in the morning. The temperature chart may be altered by the complication of malaria. Very often, just before death, the temperature falls and keeps to subnormal for weeks. The pulse is rapid, regular, equal, small in volume, low in tension. The frequency was observed by Wiggins during the first month to be 116, during the second 131, during the third 135, during the fourth and onwards 151. A dicrotic pulse may occur when the temperature rises. The rate of the respirations are increased, especially in the evening, the proportion corresponding with the pulse.

Oligæmia is always present (3,500,000), but in cases just before death, if cyanosis occurs, there may be a transient abnormal increase of red corpuscles = 6,500,000. But the general average is 2,000,000. In relation with the diminution of red blood corpuscles is the reduction of hæmoglobin. Leucocytosis is present just before death, when we can observe the increase of polymorphonuclear leucocytes, then always a relative increase of large mononuclear leucocytes (due to malaria).

The lungs show nothing at first, in later stages there may be hypostatic congestion, due to recumbent position. The appetite may be poor, but sometimes it is ravenous. The food is digested and well assimilated.

A common complication is craw-craw. The papillæ over the legs and arms are hypertrophied; arms, abdomen and chest are streaked with white lines from the scratching provoked by an incessant pruritis, associated with numerous scaly papules, and often with lice. The motor power is diminished towards the end. The genital powers cease; fits of an epileptic nature sometimes occur. Christy frequently saw cases of crying and laughing, or symptoms of a peculiar nature bordering upon a cataleptic condition.

Later, lethargy deepens, nutrition fails, the body wastes, emaciation and often diarrhœa sets in; bedsores and boils develop, and ulcerations of hand (also due to chigger) form, the lips swell and dry, the saliva dribbles from the corner of the mouth, the scalp is dry and scurfy. The patient becomes thinner and almost unconscious, lying on his side with the limbs powerless and flexed. Bronchitis or lobar broncho-pneumonia may often occur; extensive ulcers on the hips, ilio-sacrum, shoulders and elbows, usually appear; diarrhœa, with involuntary passage of urine and fæces, coma and progressive asthenia carry off the patient, who dies usually in a convulsive seizure. The average duration of the lethargic stage is four to nine months.

Pathological Anatomy.

The condition of the nutrition of the body depends upon the duration of the disease. *Rigor mortis* is always present. Slight enlargement of the superficial lymphatic glands can be made out. The brain is congested, the vessels considerably dilated, and sometimes containing decolourised thrombi (Bruce). The lesions of the brain predominate on the convexity of the hemispheres; here the vessels are injected, the convolutions are flattened, the sulci are filled with an excess of subarachnoid fluid, giving them a ground-glass appearance. The arachnoid is opaque, thick and milky; it may even be adherent to the brain (this fact was never seen by the Portuguese Commission in West Africa), owing to arachnoid meningitis, the infra-arachnoid section is in excess in the lateral ventricles and the subserous spaces; the fluid is never transparent, and is sometimes bloody; it is most abundant in acute cases when the congestion of the arteries and veins of the *dura mater* is pronounced. In the cerebellum similar changes to those met with in the cerebrum are present. The cerebral exudation contains a large quantity of mononuclear leucocytes, especially in the sulci and the perivascular spaces. The essential lesion, shown by Mott, is an extensive chronic meningo-encephalomyelitis. The nerve cells are altered and irregular; there is a loss of Niessel's bodies, diminution or atrophy of connecting fibres. The arachnoid of the cord is similarly affected by a perivascular infiltration. The axis cylinder and medullary sheath of the spinal nerves show a diffuse degeneration. The crowding with mononuclear leucocytes of the *pia mater* and perivascular spaces, the lymphatic system of the brain, indicates the endeavour of the organism against the toxins elaborated by the parasite.

Neither in the pineal gland nor in the pituitary body is any abnormal condition found. The heart is flabby, pale, yellowish, and very often shows concentric hypertrophy of the left ventricle. No signs of endocarditis are recorded; there may be leucocytic infiltration, as in other organs. The lungs sometimes

are congested; the increased size of the liver must be referred to old malarial infection; so probably we can say of the spleen when it is enlarged. The spleen shows a deep leaden colour, and is quite soft. The kidneys, the stomach and intestines are normal; there may be enlargement of the mesenteric glands.

The *Diagnosis* is not difficult. The present or former residence of the patient and the history of the disease are of invaluable aid. Brain syphilis, tabes, general progressive paralysis, must be excluded.

Prognosis. — Very grave, no one has seen a case recover.

Treatment.—Nil.

Prophylaxis.—Knowing the etiology of this terrible disease and its spread by the bite of an insect, the prophylaxis resolves itself into destruction of, or protection from, this dangerous pest as in malaria. The principal points are: (1) to avoid tsetse zones; (2) when in a tsetse-fly area the body must be protected from bites; (3) wire gauze nets should be applied to every opening of the dwelling houses in the infective areas; (4) extermination of these very dangerous diptera, and, when it is possible, suppression of the conditions favourable to this disease; (5) isolation of the patients or their removal from the tsetse-fly country to prevent their infecting others.

BIBLIOGRAPHY.

Doenca da Soruno, Lisbona, 1901, in JOURNAL OF TROPICAL MEDICINE, May, 1902.
Cook, JOURNAL OF TROPICAL MEDICINE, July, 1901.
Ziemann, JOURNAL OF TROPICAL MEDICINE, October, 1902.
Cagozal et Lepierre, *Columbia Medica*, 1897, Nos. 30-31
Brault et Lapin, *Archives de Parasitologie* 1898, No. 3, 369.
Broeden, *Proceedings of the Royal Society*, May 8, 1903.
Castellani, JOURNAL OF TROPICAL MEDICINE, June, 1903.
Low, *British Medical Journal*, March, 1903.
Nepveu, *Mémoires de la Societé de Biologie*, 1898, December.
Forde, JOURNAL OF TROPICAL MEDICINE, September, 1902.
Manson, "Tropical Diseases," London, 1903.
Laveran et Mesnil, *Archiv. fur Profistenkunde*, 1902.
Dutton, "Thompson Yates Laboratory Reports," Liverpool, vol. iv., part 2, 155.
Plimmer and Bradford, *Quart. Journ. of Micr. Soc.*, vol. xiv., part 3, February, 1902.
Sambon, JOURNAL OF TROPICAL MEDICINE, July, 1903.
Christy, "Reports of the Sleeping Sickness," Royal Society, No. 3, 1903.
Castellani, "Reports of the Sleeping Sickness," Royal Society, No. 2, 1903.
Bruce, "Reports of the Sleeping Sickness," Royal Society, No. 4, 1903.
Manson, JOURNAL OF TROPICAL MEDICINE, December, 1898, November, 1903.
Guiart, JOURNAL OF TROPICAL MEDICINE, January, 1904.

Sleeping Sickness.

ADAMS, A. M. Trypanosomiasis and Morbus Dormitiva. *British Medical Journal*, April 16, 1904.—Adams draws attention to the clinical resemblance between trypanosomiasis and sleeping sickness, and suggests that the complete sexual life of the parasite takes place in the rat, which becomes thereby the vehicle of infection.

PORTUGUESE COMMISSION (Bettencourt, A., Kopke, A., Mendes, C., and Rezende, G. de). Ueber die Aetiologie der Schlafkrankheit. *Centralblatt fur Bakteriologie*, Jena, vol. xxxv., No. 3.

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THE

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JULY 1, 1904.

THE INSTITUTE OF PUBLIC HEALH—DINNER TO MR. CHAMBERLAIN.

SPEECH BY MR. CHAMBERLAIN.

THE fellows and members of the Royal Institute of Public Health entertained Mr. Chamberlain at dinner on June 30th, in recognition of his services to preventive and tropical medicine while filling the office of Colonial Secretary. Professor W. R. Smith, President of the Institute, occupied the Chair, and there were present upwards of 200 gentlemen, including, in addition to the guest of the evening, the Prime Minister, the Duke of Northumberland (Vice-Chairman of the Liverpool School of Medicine), the Duke of Marlborough (Under Secretary for the Colonies), the Earl of Onslow (President of the Board of Agriculture), the Duke of Abercorn, Lord Strathcona and Mount Royal, Mr. Alfred Lyttelton (Secretary for the Colonies), the Bishop of Ripon, Lord Iveagh, Sir Edward Sassoon, M.P., Sir Joseph Fayrer, Sir Patrick Manson, Surgeon-General

Sir Francis Lovell, Mr. William Adamson (Vice-Chairman of the Liverpool School of Tropical Medicine), Major Ronald Ross, Admiral Sir E. R. Fremantle, Sir William Broadbent, Sir William Macgregor, Sir Alfred L. Jones (Chairman of Liverpool School of Tropical Medicine), Sir A. W. Rücker (Principal of the London University), the Lord Mayor of York, and Mr. James Cantlie (Hon. Secretary of the Institute).

After the patriotic toasts had been duly proposed and loyally received, the President next proposed "Our Guest." He said they were gathered there that night simply to express their great indebtedness to the statesman who had done more than any other in the position of Colonial Secretary to promote the health and increase the strength of our countrymen and fellow-subjects in the Greater Britain beyond the seas. He sincerely hoped that his successors would follow him in that noble example.

Mr. Chamberlain, who rose amidst much cheering, expressed his gratitude to the Royal Institute for the honour they had done him in admitting him to their Honorary Fellowship. He would say also how much he appreciated the cordial references the President had made to his past career, and the enthusiasm with which the company had drunk the toast. His embarrassment was very great. While listening to the President he had fancied he must be hearing the biography of some other man. He was not aware, himself, of any exceptional circumstances to justify the distinction that had been conferred upon him. He had applied to himself, to his own disadvantage, the well-known couplet: "The thing itself is neither rich nor rare. One wonders how the dickens it got there." He claimed no more than might justly be claimed by every other statesman, by everyone who was interested either in social reform or in Colonial development, that was, the interest which they all took in the work of medical research and preventive medicine, and the expectation they entertained of the great results which might be expected from it. The President had, indeed, referred to a period to which he looked back as perhaps the happiest in his life, for it was the only period in his public career in which he had everything his own way, the period when he had the honour to be the Mayor of the great city to which he owed so much. It was true that at that time he had unusual opportunities, and he was glad to think that what was done thirty years ago had been continuously maintained and extended to the benefit of the town, and was an example to all other cities in the country. Then, again, as Secretary for the Colonies, there was brought home to him, as it must be brought home to everyone who filled that position, how important it was that care should be taken for the health of those who were working across the seas; and taking advantage of the opportunities the office gave him, he was able to secure some tangible expression of the interest universally felt of the good effect of the work done by such institutions as that. His presence at that gathering, which brought together the experts in medical science, and the statesmen and legislators who could give effect to their conclusions, was, he felt, a sufficient justification, and he hoped nothing but good could result by calling public attention to the importance and magnitude of the work. He had often heard it said that while surgery had made gigantic progress in the last generation, medical science had not advanced in the same proportion. If he might borrow an expression from his distinguished friend, the Prime Minister, he might say he was quite a child in these matters; but this he knew, that medical science had, at any rate, in the last few years, thrown a flood of light on the origin of disease, and that at any rate was the first step to the cure of disease. This was eminently true as to diphtheria, and they might be, if they followed on the same lines, on the eve of great discoveries which might relieve the human race from some of the greatest scourges which had afflicted it. While they looked with confidence to further results of corrective medicine, he believed they were all agreed that preventive medicine was even better still.

Sanitary Reforms.

In the 'seventies he recollected hearing Mr. Disraeli make a speech, which was at that time the subject of ridicule from himself, in which he spoke of sanitary reform as the foundation of

every other reform. None of them were likely to ridicule such a statement now. To-day they felt that sanitary reform was not unworthy of the highest statesmanship. Now they recognised that without it social reform was an empty phrase. Preventable disease at this moment was the great agent for filling our workhouses, for raising our taxes, for weakening the fibre of the people, for preventing us from competing successfully in that eternal struggle for existence. In peace it was of the utmost importance. In war the same cause destroyed more of our soldiers than the bullets of the enemy, and meanwhile the administration of the Empire was losing in efficiency by preventable disease, to which the agents of the Empire were constantly subject. To the efforts of men like Sir Patrick Manson, Major Ross, and Professor Haffkine, and others who had devoted their time to tropical medicine, his attention was chiefly directed. The work of the beginning of the present century was the consolidation of the Empire. The increasing greatness of our Empire might well fill even the boldest with some anxiety. It had not been the creation of a policy steadily pursued. We had somehow or other blundered into the best places in the world. Our statesmen had drifted. But this word did not apply to the men whom we had sent out from Scotland and Ireland and England into all parts of the world, who had left their bones in foreign countries to make the Empire of which we were so proud. He wished it were possible, by some sort of telepathic machinery, to bring before an English audience a picture of what the British Empire was doing at any particular moment. What a testimony such a picture would be to the still surviving virtues of the race. They would find English officers, almost boys from school, leading on native troops to victory under every conceivable circumstance. We were always at war. The gates of the temple of Janus were never closed in the British Empire. Wars were a necessity to the Empire, and must be expected in the future, although he hoped that they might be less frequent. Let them remember that these wars saved more lives than they caused. As in India, so in Africa.

The Assets of the Empire.

The late Lord Stanley once told him he believed that the loss of life in Africa was no less than 2,000,000 lives a year, owing to intertribal wars and the slave raids. Wherever the British flag went, after the loss of some lives, perhaps, peace was established, and every man under the flag could live in security of life and property. But still more interesting and striking were the victories of peace in the Empire. A picture of the Empire such as he had suggested would show the men for whom we did so little, and who did so much for us, dealing with every conceivable problem of Government—with education, trade, above all, the development of the countries given into their charge. What had they done for us? They had given us the proudest heritage that ever man enjoyed, and they had laid upon our shoulders the greatest burden any nation ever bore. He rejoiced in both things. He firmly believed that this burden had made us greater and better, because it had released us from a mere provincial existence, from a petty and detestable parochial selfishness into which we might otherwise have fallen. The conclusion was that these men were the great assets of the British Empire. Let us prize them, let us do everything to keep them in life and in the vigour of life. For this reason he attached so much importance to the investigations which had been carried on. He believed—sanguine optimist as he always was—that in the course of time the tropical climates would be rendered suitable for white men to live in comfort. Some of the almost unknown students in London, in Liverpool and elsewhere, were doing more good for the Empire than any statesman had been able to do, however high his position.

The other toasts were "Preventive Medicine of the State," proposed by the Duke of Northumberland; replied to by Mr. Arthur J. Balfour, First Lord of the Treasury. "The Guests," proposed by Mr. James Cantlie, Hon. Sec., Royal Institute of Public Health; replied to by The Earl of Onslow, Secretary of State for Agriculture. "The Royal Institute of Public Health," proposed by the Duke of Marlborough, and responded to by the President.

Reprint.

FURTHER NOTE ON SOME ADDITIONAL POINTS IN CONNECTION WITH CHLOROFORMED CALF VACCINE.[1]

By Alan B. Green, M.A., M.D.(Cantab.).

Communicated by Dr. W. H. Power, C.B., F.R.S.

(From the Government Lymph Laboratories.)

A Communication made to the Royal Society and published at the request of the Society.

Since April, 1903, the date of my preliminary note[2] on this subject, the preparation of calf vaccine by the chloroform process has been carried on at these laboratories, and a large number of vaccines have now been treated by this method. These lymphs have been freed from their non-spore-bearing extraneous bacteria within a period ranging between one and eight hours after their collection from the calf, and have, subject to the usual tests, been issued for general vaccination purposes about two weeks after collection. Their use has resulted in high "case" and "insertion" success.

The following points in connection with these vaccines have been investigated.

The Effect of Temperature in the Elimination of Extraneous Micro-organisms from Crude Calf Vaccine by the Chloroform Process.

It has been ascertained that the temperature at which vaccine emulsion is subjected to the chloroform process determines largely the rate at which the extraneous bacteria of that emulsion are eliminated. This has been shown in two ways.

In the first set of experiments vaccine emulsion, consisting of one part by weight of pulp and two parts by weight of water, was divided into several equal portions. Each portion was then submitted to a predetermined and separate temperature along with the set of apparatus to be used for its treatment with chloroform. These temperatures ranged from 10° C. to 37° C. In each case after both emulsion and apparatus had reached the requisite temperature of the experiment, passage of chloroform vapour and air through the emulsion was effected.

It was found by means of plate cultivations that elimination of extraneous micro-organisms was most rapidly effected in the case of the emulsions chloroformed at 37° C., and that elimination was most slowly effected in the case of the emulsions chloroformed at 10° C. Between these temperatures the gradation of germicidal action was very constant.

The potency of these vaccines was subsequently tested by inoculations on calves, with the result that vaccines which had been subjected to the chloroform process at temperatures below 30° C. caused rather better vesiculation than the vaccines treated at temperatures above 30° C.

In the second set of experiments, vaccine emulsion, prepared as before, was divided into a number of equal portions, each of which was placed in a separate test-tube. In this case the emulsions were all subjected to the chloroform process at 15° C. After the passage of chloroform vapour and air through the emulsions for half an hour, the entrance and exit of each vaccine tube were clamped in order that none of the contained chloroform might escape, and the tubes were placed in temperatures ranging from 10° C. to 37° C. for twenty-four hours. In the case of these emulsions, where the amount of chloroform present in each must have been approximately the same, a similar gradation of germicidal action was evidenced as in the former set of experiments; elimination occurring most rapidly in the case of emulsions submitted to a temperature of 37° C., and most slowly in the case of emulsions submitted to a temperature of 10° C.

The potency of each of these vaccine emulsions was tested as before by inoculations on calves, with the result that vaccines which had been submitted to temperatures below 30° C. gave slightly better vesicles than vaccines which had been submitted to temperatures above 30° C.

Both series of experiments indicate that the temperature at which extraneous bacteria are killed most quickly in vaccine emulsion by the chloroform process, the specific germ being left meanwhile in state of full activity, lies probably between 18° C. and 23° C.

The Species of Micro-organisms Killed by the Chloroform Process.

In addition to the extraneous micro-organisms mentioned[3] as commonly occurring in crude calf vaccine and as being eliminated therefrom by means of chloroform, experiments have been made with further species of bacteria. These, with the exception of *B. proteus vulgaris* and *B. coli communis*, have never been found in vaccine lymph at these laboratories, but they have been subjected to the action of chloroform in order that knowledge of the germicidal value of that process might be extended. The bacteria thus experimented with are: *B. proteus vulgaris, B. prodigiosus, B. pyocyaneus, B. fluorescens liquifaciens, B. coli communis, B. typhosus, B. diphtheriæ, B. mallei, B. pestis, B. tuberculosis, and Spirillum choleræ Asiaticæ.*

Broth emulsions of these bacteria were first experimented with. As soon as an emulsion was established a suitable culture medium was inoculated with a small portion of it and duly incubated, in order to ascertain whether the species of micro-organism in question could be easily recovered from the emulsion. The passage of chloroform vapour and air through the emulsion was then begun, and during the process at regular intervals further cultivations were made from it. In every instance the bacteria of experiment were found to have been killed, at intervals ranging from one to eight hours from the commencement of the process.

In a second set of experiments vaccine emulsions were prepared by mixing one part by weight of pulp with two parts of weight by water. To these emulsions the bacteria to be experimented with were added, and cultivations at once made therefrom in each instance, to ascertain whether recovery of the

[1] Received April 19 – Read May 5, 1904.

[2] *Roy. Soc. Proc.*, 1903.

[3] *Proc. Roy. Soc.*, 1903.

bacteria was possible. Passage of chloroform vapour and air through the emulsions was then carried out and further cultivations made from them from time to time. As in the case of the broth emulsions, after the passage of the chloroform vapour and air for a few hours the bacteria in the vaccine emulsions were killed.

In the case of each experiment of the two foregoing series, a "control" preparation was established in which the bacteria were found to be still alive after the bacteria of the corresponding experimental preparation had been killed.

The vaccine used in these experiments was collected for experimental purposes only.

The Keeping Properties of Chloroformed Vaccines.

The keeping properties of chloroformed vaccines have been tested in the following ways:—

First, vaccine lymph freshly collected from the calf was divided into two portions. One portion after emulsification with water was subjected to the chloroform process and, after elimination of its extraneous micro-organisms, the chloroform was partly removed by the passage through the emulsion of a stream of sterile air. The other portion was emulsified with 50 per cent. of glycerine and water solution. These chloroformed and glycerinated solutions were, within twenty-four hours of their collection from the calf, each subdivided into five parts, one part of each being stored at 10° C., 20° C., 25° C., 30° C., and 37° C. The potency of these several parts was subsequently tested on calves at regular intervals of time. The result showed (*a*) that the highest potency was retained for the longest time, alike for the chloroformed and glycerinated portions, by the emulsions stored at 10° C., for the shortest time, alike again by both portions by emulsions stored at 37° C.; and (*b*) that the potency as between the chloroformed and glycerinated vaccine kept at any one of the foregoing temperatures was practically the same, the only marked difference occurring in case of the vaccines kept at 37° C., a temperature at which the chloroformed emulsions retained potency for a longer period than did the glycerinated emulsions.

Upon the completion of the foregoing experiments, a further number of vaccines collected from vesicles of good average quality were emulsified with water in the proportion of one part by weight of pulp to two parts by weight with water, and subjected as before to the chloroform process. When elimination of their extraneous bacteria had been effected, part of the chloroform was removed from the emulsions, and these were placed in the ice chest at 10° C. Immediately prior to the issue of these vaccines the remainder of the chloroform was removed and glycerine added in the proportion of two parts by weight of glycerine to the original weight of vaccine pulp. These vaccines were later, after passing the requisite tests, issued for general vaccinating purposes, a similar interval being allowed to elapse between their collection from the calf and subsequent issue as is usual at these laboratories in the case of glycerinated vaccine, namely, about six weeks. In the case of two of these chloroformed vaccines an interval of two months elapsed between collection and issue.

The use of these chloroformed vaccines has been attended with results showing high "case" and "insertion" success.

Summary.

Experience of the further use of the chloroform process in the preparation of a large number of vaccines during the past year confirms the conclusions arrived at in a former paper.[1] And meanwhile important additional knowledge has been gained, namely, that chloroformed calf vaccine, if originally of sufficiently high potency, will, when prepared and stored under suitable conditions, retain for a considerable time a high degree of potency, and this notwithstanding that the extraneous organisms had been rapidly eliminated from it in an early stage of its preparation.

[1] *Roy. Soc. Proc.*, 1903.

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By Fritz Schaudinn (Rovigno).

(*Translated from the German by P. Falcke.*)

(*Continued from p.* 189.)

(*b*) The Multiplication of the Asexual Trypanosomes in the Mid-gut of the Mosquito.

The multiplication of the trypanosomes from the ookinets, which are not sexually differentiated, always takes place by means of longitudinal division. This entirely coincides with the mode of propagation of other species of this genus which we have learnt by means of the researches of Rabinowitch and Kemper, Senn and von Wasielewsky, Laveran and Mesnil, Léger, and others. The longitudinal division of the plasma, which commences at the anterior extremity and proceeds backwards, precedes the division of the nuclear apparatus. As in other trypanosomes, this can commence either with the blepharoplast or the nucleus. The duplication of the locomotor apparatus always commences at its root and proceeds from the individual blepharoplast, or from the new daughter part of the old blepharoplast. The old flagellate apparatus remains unchanged, while that of the daughter has its foundation laid in the same manner as that of the parent, *i.e.*, immediately parallel and next to that of the latter by means of the above method of nuclear division. Thus the duplication of the flagellate apparatus does not ensue by means of longitudinal division of the previously existing, but by means of a new formation in the track of the old one from the basis. The whole process is so complicated that it is impossible to give all the details without numerous illustrations. The final result, however, again accords with Laveran and Mesnil's observations. As is the case in the *Crithidia* of Léger, so in this form there are alternate periods of movement and rest. In the resting condition, the flagellated body bores into an epithelial cell of the intestine, with the anterior extremity of the flagellum and contracts its body. The flagellate apparatus fre-

Lieutenants of the Indian Medical Service who recently completed a Course of Instruction in the Royal Victoria Hospital, Netley, and the Royal Army Medical College, London.

Lieutenants: Quirke, Holmes, Hodgson, White, Watts, (1st Montefiore prize), Brayne, Roberts, Stranger-Seathes, Finlayson, Anderson, Brodribb, Irani, McGillivray (2nd Montefiore and Maclean prize.)

Lieutenants: McCowen, S. W. Jones, Hirst, Sarr, (Webb medal). COLONEL KENNETH MACLEOD. Baber, Drake, (Martin medal). Gillet, L. D. Jones.

quently retrogrades to a short rod-like structure, which then serves as a clinging organ for the anchorage of the parasite in the epithelial cell. Like *Crithidia*, the form under discussion can also increase by means of longitudinal division during the stage of rest, when copious *clusters* of parasites often develop on the intestinal epithelia. The time of their settling generally coincides with the end of the digestion of the blood; it can, however, take place earlier. As a rule, however, with few exceptions, the parasites fasten on to the epithelium in the empty intestine. Should the mosquito suck a second time and digestion recommence, the parasites again become motile. I may mention that these gregarine-like conditions, as Léger strikingly has termed them, are found not only on the free surfaces of the epithelial cells provided with *rod-like cilia*, but also between the cells. They often even penetrate to the tunica elastica muscularis. If they go to rest here they mostly become globular in shape, and the flagellate apparatus entirely disappears; on these forms again becoming free the flagellum is again newly formed from the blepharoplast.

(*c*) The Development of the Ookinets into the Female Trypanosoma.

The ookinets, which show female characteristics, exhibit the same nuclear conditions as in the form described above and from which we started, but the plasma exhibits an additional structure, for it is more or less closely filled with dark stainable bodies which probably represent reserve materials. The nucleus, according to numerous measurements, appears to me, as compared to the volume of the plasma, to be smaller than in the ookinets which develop into indifferent trypanosomes. The formation of the heteropole spindles takes place in the same manner as in the indifferent forms; fig. 2, *a*, represents a stage in which the division of the nucleus has been completed. Whereas in the indifferent forms the blepharoplast remains connected with the nucleus and produces the flagellate apparatus immediately, the smaller nucleus in this case leaves the larger and immediately multiplies by means of three rapidly successive duplications to eight small compact nuclei, which move into the posterior section of the cellular body.

Each of these eight nuclei, by means of heteropole division, now produces a smaller nucleus next to itself, and which remains connected with it (fig. 2, *c*). After this stage the eight groups of nuclei perish by gradually becoming smaller and finally disintegrating and dissolving entirely. During this process in the posterior half of the ookinets the large nucleus develops two smaller ones by means of heteropole mitosis (fig. 2, *c*). This becomes the blepharoplast by forming the flagellate apparatus in a manner similar to that of the indifferent ookinets. The complete female trypanosome is shown in fig. 2, *d*. It is distinguished from the indifferent one by being more plump and by the darker colouration of the endoplasm laden with granular reserve materials. The flagellate apparatus is less developed, the blepharoplast is smaller, and the flagellum shorter. This explains the fact that the movements of these forms are more sluggish; they soon become attached to the intestinal wall. During their growth they continue producing more reserve material and may attain a size three times as large as that of the indifferent trypanosomes; they appear to have lost the capacity for longitudinal division, at all events I have never observed in them any indication of that process. The retrogression of the flagellate apparatus in the resting stage takes place in the same manner as in the indifferent forms. The gregarine shape in these stages is often more pronounced and they often, but for their lack of pigment, wholly resemble the ookinets. The older stages are finally no longer capable of transforming themselves into trypanosomes, they can only accomplish sluggish contraction movements, curves and flexions. On account of the hoarding up of reserve stuffs these worm-like resting stages of female trypanosomes are remarkably capable of resisting exterior influences and they remain alive the longest under unfavourable conditions of life. For instance, when the mosquitoes after the first meal are allowed to fast for a long time (they can be kept alive for two or three weeks without food if kept in a low temperature of 4° to 5° C.). At last all other stages of the trypanosomes in the intestine of the mosquito die off, only the female little worms remain alive in the intestinal wall. They have gradually penetrated deeper between the epithelial cells and they all lie between the epithelium and the tunica elastica muscularis. In this stage they entirely resemble the ookinets of the malaria parasites, even to the lack of pigment. The reserve materials are only used up very slowly, so that they last a long time. These are the forms which also cause the infection of the daughter generations of the mosquitoes. During the cold of winter they are able to remain alive in the ovaries of the hibernating mosquitoes and in the springtime they develop further in the eggs that are deposited. In the blood of birds also the forms corresponding to these are the most permanent and, as in malaria, always generate new relapses. As already indicated, these stages possess the capacity of reproducing all the other forms of the parasites through parthenogenesis. As this process plays an important part in the most various stages in the life of the parasite, I will now describe it briefly in order to avoid repetitions in the future.

Fig. 2.—*a*—*d*, Schematic illustration of the metamorphosis of an ookinet of female character into a female *trypanosoma*.

Later on we shall see how often this parthenogenesis of the female forms can be called into action to play the saving *rôle* in the life of the parasite. The first case in which the necessity of this process occurs sets in, as already mentioned, when the host, the mosquito, after the digestion of the first meal, is fasting with the parasites in its intestines. The indifferent forms of the trypanosoma and the males gradually perish; only the females, which are better provided with reserve material, remain alive. If now the mosquitoes after a long period of hunger are again

FIG. 3.—*a—f*, Schematic illustration of the parthenogenesis of a female trypanosoma in the gregarine condition.

fed and care is taken to keep them warm to aid digestion, the parthenogenesis of the female worms sets in. Should we minutely examine a female that has thus been exposed to hunger for a considerable time, we observe first of all that the plasma no longer contains so much reserve material: it contains several large vacuoles. No trace of the flagellate apparatus is now apparent. The blepharoplast lies close to the nucleus. Fig. 3, *a*, represents such a worm. We observe, moreover, that in the nucleus itself the central granule has again become enlarged to a complicated karyosoma-like form. The nucleus itself goes through alterations the same as we have seen to occur in the ookinets, that is to say, a small nucleus is constricted off by heteropole mitosis. Now two smaller nuclei of almost equal size lie next to the larger nucleus, namely, the old blepharoplast and the newly-made nucleus (fig. 3, *b*). The two small nuclei next—by means of two separations each—give off two reduction nuclei doomed to perish (fig. 3, *c*), and then move from opposite directions into the large nucleus, which has remained quiescent (fig. 3, *d*), to there lie side by side, and to amalgamate into a karyosoma (fig. 3, *e*).

Fig. 3, *e*, which then again resembles that of the ookinets from which we started — the illustrations, figs. 3, *a* to *f*, must serve provisionally for the demonstration of this process. In my complete work I go into the more minute details, particularly as to the conditions of the centrosomes and chromosomes, as far as the diminutiveness of the specimen will allow. By means of this kind of auto-fertilisation the organism has then received the power of development. It produces exactly the same three sorts of trypanosomes as the ookinet created by copulation; there is again a flooding of the intestinal canal as in the first infection. We can summarise the entire process from a pathological point of view as the relapse of the trypanosoma disease of the mosquito. In like manner the relapses of the halteridium disease of the owl is originated by parthenogenesis of the worm-like female forms. The process takes place exactly as is seen in the illustration. The worms found in the blood are only distinguished from those living in the mosquito by the possession of pigment. On the other hand, they exhibit no difference from the ookinets originated by fertilisation. I may here call to your mind that in my description of *Plasmodium vivaæ* also, I explained the relapses after long intervals as being due by a relapse of the old females to the stage of the schizontes. The results attained by my study of the trypanosomes as to the details of the nuclear alterations in parthenogenesis have stimulated me to test the malaria parasites of man for the discovery of this process, and though the difficulties are much harder to overcome, I am already convinced that in their case also the nuclear changes take place according to a scheme similar to that in the trypanosomes and that there is likewise a kind of auto-fertilisation. In my further researches on malaria I hope to be able to look into this question more closely.

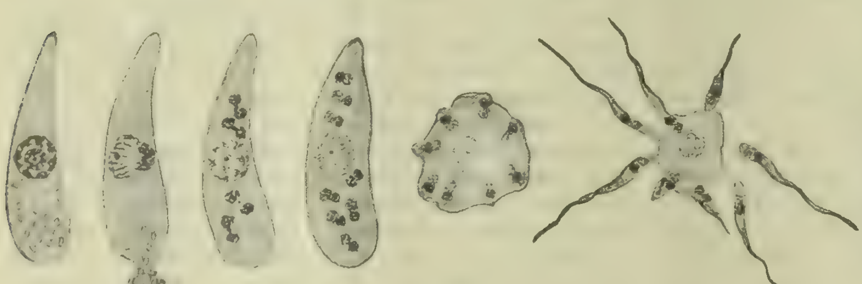

FIG. 4.—*a—f*, Schematic illustration of the development of the male trypanosomes from an ookinet of male character.

(*d*) THE ORIGIN OF THE MALE TRYPANOSOME FROM THE OOKINETS.

The ookinets which serve for the production of the male forms are distinguished from those of the female type in a remarkable manner. They appear to have no reserve materials at all. Their plasma is almost hyaline and coarsely vacuolar and much lighter than those of the indifferent forms, which occupy an intermediate position between the females and males. The size of the body is on an average somewhat smaller than in the other forms. On the other hand, the volume of the nucleus in extreme cases is palpably much larger in comparison to the plasma. In addition, the nucleus is very rich in chromatin. Fig. 4 exhibits the type of such an ookinet.

The nuclear alterations that now ensue correspond to those of the females. A heteropole spindle is developed (fig. 4, *b*), and the smaller nucleus multiplies itself to eight (fig. 4, *c*). Whereas, however, these eight nuclei perish in the female forms, they here go on

developing and it is the large nucleus that perishes. We can see from this that the males and females originally exhibit hermaphrodite characteristics in their nuclear structure and that the female nucleus is formed at the expense of that of the male, in contradistinction to the male nucleus, which develops at the expense of that of the female; or in other words, the hermaphrodite becomes either a female, some of its male portions becoming abortive, or it becomes a male, some of its female, constituents then becoming abortive. The eight nuclei of the ookinets now each develops one blepharoplast, which in case of the male is remarkably large, in fact, almost as large as the nucleus (fig. 4, *d*). The ookinet now becomes globular (fig. 4, *e*) and the eight groups of nuclei move to the periphery, assume a radiating position and in such a fashion that the blepharoplasts are directed to the *upper* surface. The plasma becomes somewhat thickened round each group of nuclei, the blepharoplast of each group then forms its flagellate apparatus through fissions of the nucleus, as has been described in the indifferent forms, and eight small trypanosomes loosen themselves off from the large residual body containing the large abortive nucleus (fig. 4, *f*).

(*To be continued.*)

Review.

Ophthalmological Anatomy, with Some Illustrative Cases. By J. Herbert Fisher, M.B., B.S., F.R.C.S. Hodder and Stoughton, 27, Paternoster Row, London, 1904. Pp. 188. Price 7s. 6d.

This is a complete and succinct account of the Anatomy of the Eyeball, and of all parts of the body which are in any way concerned with the physiological and the clinical relations of the eye. The centres for ocular movements, the cervical sympathetic, the cerebral topography and the intracranial venous sinuses are included in the scope of the book, and are minutely described. Several useful diagrams contribute to render this a useful and scientific standard work on the anatomy of the eye.

Le Malattie dei Paesi Caldi. Loro Profilassi ed Igieni. Con un'appendice; La Vita nel Brasile. Dott. Carlo Muzio, Medico di la 1ª classe nella Regia Marina. Regolamenti di sanità pubblica contro le infezioni esotiche. Con 154 incisioni e 11 tavole. Milano, Ulrico Hoepli, 1904. Pp. xi.-560.

This is a carefully compiled book in which not only the diseases, but the flora and fauna of tropical countries are dealt with comprehensively.

Clinical Anatomy: A Text-book for Students and Practitioners. By D. N. Eisendrath. Illustrated. W. B. Saunders and Co., Philadelphia and London, 1904. Pp. 515.

In completeness, wealth of illustration and clinical usefulness, this text-book on "Clinical Anatomy" has no rival. The illustrations are "teaching" to a degree, and the text is at once direct and incisive. The excellence of the paper, the size and clearness of the printing, and the readiness with which any part of the anatomy of the body can be found in the text, contribute to recommend the book even at first sight.

Notes and News.

Cattle Plague in Egypt.—R. Koch considers the disease in cattle in Egypt to be a mild form of rinderpest allied perhaps to Texas and Transcaucasian fever. He recommends the isolation of infected animals and the use of prophylactic injections.

Fees for Medical Attendance in India.—The Governor in Council has issued an order that when a medical officer attends chiefs and nobles, and native gentlemen in high position in a native state that he be not allowed to accept a larger fee than 2,000 rupees. Should the proposed fee exceed this sum the matter has to be submitted with a full report by the local government for consideration and orders of the Government.

Vaccination in Burmah.—Dr. T. F. Pedley, in a communication to the *Rangoon Gazette* of April 27th, 1904, condemns the quality of the lymph available for vaccination purposes in Burmah. It appears that the grant for the vaccination depôt for the production of animal lymph was withdrawn in 1900. Since that date lymph is only procurable from a great distance, and during its transmission the potency is so reduced that for all practical purposes it is useless. The Burmese are questioning the value of vaccination and Dr. Pedley sympathises with their contention, inasmuch as lymph available for use is of an inferior quality. It is to be hoped the question will be dealt with promptly by the Indian Government, otherwise we shall no doubt hear of "questions" in the House of Commons being asked upon the subject.

A Chinese Remedy for Hydrophobia.—In the *Lancet* of May 14th, 1904, V. G. Thorpe writes upon a Chinese remedy for hydrophobia. An analysis of the remedy proves it to be ordinary strychnine, but the use of the remedy is followed by narcotic and sudorific effects which seem to prove that the Chinese doctors add some additional drug in the cure.

Tangier is commended as a health resort by Mr. Ernest Solly in an article written for the *Journal of Balneology and Climatology* for April, 1904. It may be interesting to note that, although there are many British and American visitors, no English speaking doctor has been in practice there since 1902. An excellent opportunity for establishing a practice seems possible in Tangier.

The Livingstone College Year Book for 1904 gives an encouraging account of the work being done to equip missionaries for the Tropics, and contains

a great deal of useful information on health in the Tropics. The College is situated at Leyton in Essex. The Principal of the College is Dr. Harford, under whose energetic guidance the Institution is developing in various directions.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Manila.

The chief and more important causes of death occurring in Manila (population, 219,941) during February, 1903, with the total number of deaths from each cause, and the number occurring among children of less than one year of age, were as follows:—

Cause	Total deaths	Deaths under 1 year of age
Convulsions of children	259	259
Pulmonary tuberculosis	78	0
Chronic bronchitis	41	25
Acute bronchitis	40	36
Eclampsia, non-puerperal	36	36
Congenital debility	28	28
Meningitis	24	19
Beri-beri	20	0
Diarrhœal diseases	13	12
Dysentery	13	1
Bright's disease	10	2
Typhoid fever	8	0
Pneumonia	8	0
Cerebral congestion	7	0
Tetanus..	7	5
Plague	6	0
Malarial fevers	5	0
Other diseases of infancy	5	5
Puerperal septicæmia	4	0
Cholera	3	0
Broncho-pneumonia	3	1
Asthma	2	0
Leprosy	1	0

Sudan.

"Leishmania Donovani" in the Sudan.—S. Neave, writing from Khartoum (*British Medical Journal*, 1904, May 28th), describes having found a native boy, a patient of Mr. J. B. Christopherson's, aged 8 or 9, with Leishman-Donovan's bodies in the spleen. It is the first case of the kind reported from Africa except that reported by Laveran, as having occurred in Tunis. Dr. A. Balfour, of the Wellcome Laboratory at Khartoum, has identified the parasite and there seems every reason, from the clinical history of the case, to accept the communication as an established scientific fact. The mother states that the child's spleen began to enlarge whilst he was suckling.

Beri-beri.

Amongst the Chinese coolies on their way to South Africa to work in the mines, a few cases of beri-beri occurred during the voyage from Hong Kong to Natal. In all some 23 cases have occurred, but since the coolies arrived at Johannesburg the spread of the disease is subsiding.

Cholera.

Mesopotamia and Persia.—The British Delegate to the Ottoman Board of Health publishes in the *Lancet*, May 28th, 1904, an account of cholera in the Euphrates Valley. In previous letters to the *Lancet*, dated March 4th, July 5th and November 22nd, 1902, and January 31st, April 11th, October 10th, 1903, information of the spread of cholera in Syria and hence to Mesopotamia has been carefully recorded by this officer. From these letters we gather that cholera broke out among the pilgrims to Mecca and Medina early in March, 1902. Along the Arabian coast the disease spread, reaching the Hedjaz, the Assyr and the Yemen districts during the summer and autumn of 1902. Thence the disease travelled to Egypt and passed into Syria, reaching Damascus in November, 1902. In the towns adjacent to Damascus, cholera prevailed during the summer of 1903, affecting in turn the important cities of Hama and Aleppo. In August, 1903, cholera was reported at Biredjik, an important town on the Euphrates sixty miles from Aleppo. The next letter, *Lancet*, January 23rd, 1904, conveyed the information that cholera was diminishing in the neighbourhood of Damascus, but that the disease was spreading downwards along the Euphrates river. The towns of Anah, Kerbela and Bagdad were successively attacked, cholera reaching the last mentioned city in December, 1903, and by February 6th, 1904, Bazra (Bussorah), near the mouth of the Euphrates river in the Persian Gulf, was stricken with the disease. Up to February 12th, 1904 (*Lancet*, March 12th, 1904), the total number of cases of cholera recorded in the Turkish Empire since the outbreak in 1902, is put down at 7,652, with 6,550 deaths from the disease. The actual figures are estimated, however, to be treble these numbers. Further information is communicated to the *Lancet* and published March 20th and May 28th, 1904. In these letters it is stated that the towns adjacent to Buzra suffered severely from cholera, and that Korna, situated at the junction of the Euphrates and Tigris, Kerbela, Samawa, Djivarer, Hamara and Remineh, were all reported infected in the spring of 1904.

Little is known about the Persian towns to the east of the Euphrates and Tigris; the only town from which reliable information is obtainable being Kermanshah, just across the Persian border from Mesopotamia, and here cholera is reported to have subsided, but that in another Persian town (Kengover) adjacent to Kermanshah the disease has appeared.

It would thus appear that cholera has been present in the Asiatic dominions of Turkey during 1902, 1903 and 1904, and that the epidemic is passing eastwards and northwards into Persia, but as yet in Persia the disease has not attained alarming proportions.

Malaria.

New York.—In certain sections of New York City, investigation has shown that in some instances almost every person living within certain small areas has suffered from malarial fever during the spring and

summer months of a single season. Such outbreaks are without any question the result of local remediable unsanitary conditions, which furnish the breeding places for the mosquitoes.—Biggs, H. M., *Journal American Medical Association*, 1904, June 11th.

Plague.

Prevalence of the Disease.

India.—During the three weeks ending May 21st, 28th, and June 4th, the number of deaths amounted to 28,219, 20,484, and 13,770, respectively. In the Punjab three-fourths of the deaths occurred.

South Africa : Port Elizabeth.—During the weeks ending May 28th and June 4th, one death only, during the former week, occurred.

Transvaal.—During the weeks ending June 11th and 18th, the fresh cases numbered 3 and 4, and the deaths 0 and 1, respectively.

Mauritius.—During the weeks ending June 16th and 23rd, fresh cases, 2 and 5, deaths 2 and 4, respectively.

Hong Kong.—During the weeks ending June 11th and 18th, fresh cases, 47 and 53, deaths 46 and 52, respectively.

RAINFALL AND CHOLERA IN SIAM.

By H. Campbell Highet, C.M., M.D., D.P.H.
Medical Officer of Health, Bangkok.

Bangkok has, unfortunately, an unenviable reputation for cholera and other diseases which accompany want of proper sanitation. The city lies on both banks of the Menam Chow Phya and is about twenty-five miles from the bar, following the windings of the river. The banks are very low and the surrounding country consists of gardens and paddy-fields as level as a billiard-table. The principal source of the water-supply is from the river and the innumerable canals or klongs which intersect the city and make it practically the Venice of the East. These waterways, however, are the main sewers as well, hence the presence of cholera during the dry season is not to be wondered at.

The disease commences as a rule late in December and attains its maximum in April, thus prevailing during the dry season of the year; for the rains, starting about the end of April, continue until October. The duration of the cholera season seems to closely follow the nature of the rains. Should heavy falls take place about the end of April and early in May, especially up-country, the level of the river rises and the enhanced volume which pours down soon puts a stop to the disease. With a poor rainfall, however, I have seen frequent cases as far on as in June, and even occasional cases all through the wet season, if it be a poor one. For the same reason, the cholera season commences early if the rainfall be much below the average, which is 50 to 55 inches per annum. With a low level of the river the influence of the tide is felt for twenty or twenty-five miles above the city throughout January, February and March. This means not only the presence of a large amount of sea-water in the river for a considerable distance above Bangkok, but also retention of the sewage, which simply passes up and down a given point for days.

It is an interesting point to note the concurrence of the presence of salt in the river with the incidence of cholera in Bangkok. Here are the figures for last year, the first week of which was a fair average cholera year.

Date	Chlorine in the river water, in parts per 100,000	Deaths from Cholera
January 3 ..	7·5	4 in week ending Jan. 3
,, 7 ..	6·5	3 ,, ,, ,, 10
,, 10 ..	200	2 ,, ,, ,, 17
,, 12 ..	380	20 ,, ,, ,, 21
,, 13 ..	330	21 ,, ,, ,, 31

The amount of chlorine remained high until well on in April and cholera was prevalent until the end of June. The rainfall for the previous year was only 46·5 inches, whereas this year, with a fall of 52·4 inches up to the end of December, there was a down-flow until early in February, and even during flood-tide at the bar, ships did not swing in the river here for nearly three months. The consequence has been that whereas last year cholera was practically epidemic during March and April, this year, up to the date of writing (May 6th), no case of cholera has come to my knowledge during the dry season. The same source of water supply continues, but with a greater volume of fresh water in the river a purer supply is at hand and the chlorine has practically remained at a figure of 3 to 5 parts per 100,000 during the whole dry and hot season. Has the presence of large amounts of sea-water in such a tidal river any influence *per se* on the prevalence of cholera? It may be that such a saline medium may favour the growth of the coma bacillus, but probably the more correct interpretation is that the lower the level of the river the more sea-water enters and the greater is the accumulation and so concentration of the sewage. If the course of the river be so long as to prevent the passage of any portion of the sewage out to sea during one ebb-tide, then the following flood will simply carry it back again for a certain distance. Hence we see dead animals float down the river for days, until finally the sea is reached.

The Siamese Government is now fully alive to the importance of a pure water supply in preventing disease. An artesian well has been sunk in the barracks and a good supply of excellent potable water has been tapped at a depth of 430 feet. In boring the well, alternate layers of sand, clay and gravel have been pierced, until hard rock was struck.

The present supply is purely a deep sub-soil one, but work is about to be commenced with a view to bore through the rock in order to obtain a supply of pure water, of which there is practically no risk of contamination. These boring experiments, however, are not intended as substitutes, but only as adjuvants to a great scheme for supplying Bangkok with drinking water. At present two proposals are before the Government. One of these is to obtain the water from the river some twenty miles above the city, the other is to obtain the supply from a proposed irrigation canal, which, starting over 100 miles above Bangkok, will run down through and past the city, to

discharge into the river near its mouth. The question is now in the hands of experts, and for the good of the country an early decision is anxiously awaited.

Sleeping Sickness.

German West Africa.—In German West Africa, according to Dr. K. Hintze (*Deutsche Medicinische Wochenschrift*), sleeping sickness has existed in the colony about thirty years, but the disease seems to have almost disappeared until 1895. A few cases occurred every year from 1895 to 1902, when a sudden increase in the numbers was reported. At present, however, the cases of sleeping sickness seem to be diminishing. At no time can the disease be said to have widely spread, seeing that since 1896 it has occasioned but forty-eight deaths. Hintze has failed to find either bacteria or trypanosoma in the cerebro-spinal fluid of sleeping sickness cases in German West Africa.

Tetanus.

United States.—Tetanus is said to be more frequent in Negroes than in white persons, and is more prevalent in the Tropics than in the temperate zone.

PREVALENCE.

The distribution of tetanus in the various States, as shown by the United States census for 1900, is interesting. During that year 1,664 deaths were recorded; 185 of these were in Louisiana; 147 each in New York and Pennsylvania; 125 in Texas; 90 in Illinois; 76 in Ohio; 74 in Florida; 61 in Alabama; 56 each in Indiana and New Jersey; 51 in Virginia; 48 in Maryland; 46 in Georgia; 43 in Missouri, and 41 in Tennessee. Louisiana, with a census population of 1,381,625, heads the list with 185 deaths.

The total number of deaths due to "Fourth of July injuries" in 1903 is 466, of which 406 were due to tetanus. Pennsylvania heads the list with 86, and is followed by Ohio with 77, Illinois with 59, New York with 41, Michigan with 31, Missouri with 29, Massachusetts with 17, Minnesota with 15, Iowa with 16, Indiana with 14, Kansas with 13, and New Jersey and Wisconsin with 10 each. With but few exceptions the victims were small boys.—Stanton, S. C., *Journal American Medical Association*, 1904, June 11th.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Distomum—New Variety.

ASKANAZY, M. A New Distomum in Man, *Deutsche Medizinische Wochenschrift*, 1904, May 5.—Three years ago Askanazy described a parasite in cats and dogs, the *Distomum felineum*. He also recorded the fact that it had been found in man. Recent investigations have shown that the parasite exists not infrequently in the biliary passages of man, and that it occurs in association with carcinoma so frequently that Askanazy has been led to investigate the possible connection between the presence of the distomum and the existence of cancer in the biliary passages of animals. The cats and dogs in seaport towns were found mostly afflicted, and Askanazy, on searching for a cause, ascertained that the roach (*Lencisus rutilis*), which was commonly consumed raw by these animals, harboured the distomum parasite. Curiously enough also one of the patients who suffered from distomum declared that he had been in the habit of eating raw fish. The author is prosecuting his enquiries and feeding dogs on infected fish, with the idea of observing whether cancer results or not.

Dysentery.

HASTINGS, R. W. A Clinical Study of the *Bacillus Dysenteriæ* in Boston and Vicinity, *Journal American Medical Association*, 1904, April 30.—Hastings, during the autumn of 1903, had opportunities of investigating closely some thirty-five cases of dysentery, in twenty-eight of which he found the *Bacillus dysenteriæ*. He differentiates between the "Harris" and the "Shiga" bacillus, and of the twenty-eight cases recorded twenty-three showed the Harris bacillus, three the Shiga, and in two the bacilli were not present. Two of the cases were breast-fed infants of 11 and 10 months respectively. In the former, erysipelatous inflammation was present in the heel and leg. When the child was first seen there was sloughing of the skin and abscesses. In the latter the dysentery concurred with the use of a breast pump by the mother, owing to her nipple being cracked and tender. In the treatment a serum produced from horses in precisely the same way as diphtheria and toxin is produced was tried, but the result did not prove eminently successful.

ROSENTHAL, L. A New Serum for the Cure of Dysentery, *Deutsche Medicinische Wochenscrift*, 1904, May 5.—With a curative serum obtained from the horse Rosenthal has made some successful experiments in the treatment of dysentery. He has employed the serum in 157 cases, giving from 20 to 40 cc. in each case, and reduced the dysentery in the hospital at Moscow from between 14 and 17 per cent. to 4½ per cent. Recovery takes place within one or two days if the serum is given within three days after the commencement of the disease.

Dysentery—Chronic.

D. A. B. COOK, Nashville, U.S.A., considers the term "chronic dysentery" a misnomer and suggests it should be dropped. The idea of a necessary relation between bloody discharge and chronic dysentery is based on a false assumption. The term "chronic dysentery" does not refer to a definite pathologic entity, as the condition associated with the ailment has a purely local seat in the intestine.

Leprosy.

BRAULT, I. *Quelques reflexions sur certains traitements actuellement usiter dans la lepre. Annales de Dermatologie et de Syphiligraphie*, Paris, 1904, vol. iv., No. 10.—Brault advocates mercurial treatment in leprosy. He remarks that mercury relieves the signs and symptoms, and whilst it cannot cure the patient, serves to relieve and console him.

Malaria.

ZERI, A. Pernicious Malaria Infection, *Il Policlinico*, 1904, April.—After a careful study of four cases of pernicious malaria fever contracted in the Roman Campagna, Zeri draws attention to the fact that the malarial parasites may be very few in number in the blood. He found no organisms with central masses of pigment, and he warns medical men not to be misled by the paucity of the parasites found in the blood into the belief that it cannot be malaria that is causing the severe symptoms. The patients suffered from a variety of symptoms, including hæmorrhage from the stomach, abdominal pains, with vomiting, cerebral symptoms, middle ear affection, vertigo, &c. Quinine, especially when administered hypodermically, is effective when given early in the illness.

Oral Hygiene.

TALBOT, E. S. The Panama Canal and Oral Hygiene. *Journal American Medical Association*, 1904, April 30. — Interstitial gingivitis seems to prevail extensively amongst the American soldiers in the Philippines. A similar ailment was observed amongst the workmen on the Jungfrau railroad in Switzerland. Talbot says that a similar disease attacks the teeth and gums in the north-western parts of the United States. The disease is not unlike scurvy, and the treatment is the same.

Plague—Prevention.

MARSH-BEADNELL, C. The Prevention of Bubonic Plague, *British Medical Journal*, 1904, May 14.—From the fact that the plague bacillus gains access by abraided surfaces, this observer recommends that all natives dwelling within a plague-infected area should be compelled to wear boots or shoes, seeing that the groin glands are most often found swollen in cases of plague.

Plague Serum.

GODINHO, V. Serum Therapy in Plague, *Presse Medicale*, 1904, January 27.—Godinho states that he has discovered a curative serum for plague that is effective as late as the fifth day of the illness. He has tried the remedy at San Paulo, Brazil.

Relapsing Fever.

SANDWITH, F. W. Relapsing Fever in Egypt. *The Practitioner*, London, May, 1904.

Stomatitis in Indian Jails.

DUTT, N. C. Jail Stomatitis, *Indian Medical Gazette*, May, 1904.—Dutt maintains, in opposition to Buchanan ("Jail Hygiene"), (1) that stomatitis, as met with in jails in India, has nothing to do directly with malaria; (2) that it is probably due to irritation of the mucous membrane of the alimentary canal by an acrid substance, the product of fermentative dyspepsia; (3) that stomatitis and dysentery in jails develop coincidently.

Yellow Fever and Malaria.

BANDI, I. Gelbfieber und Malaria (Yellow Fever and Malaria). *Centralblatt für Bakteriologie*, Jena, vol. xxxv., No. 3.

Colonial Appointments.

DR. T. K. J. FULTON, Government Medical Officer of the Wallaroo Hospital, South Australia, has succeeded Dr. F. Goldsmith, who has resigned, as Medical Officer of the Northern Territory of that State.

DR. D. J. WILLIAMS has succeeded the late Dr. J. W. Plaxton as Medical Superintendent of the Lunatic Asylum, Jamaica.

DR. J. A. DE WOLF, Surgeon-General of Trinidad, has arrived in England on leave of absence, during which Dr. C. F. Knox acts as Surgeon-General, Dr. J. W. Eakin as District Medical Officer Port of Spain North, and Dr. E. I. Reid as District Medical Officer Port of Spain South.

IN consequence of the death of Sir David Palmer Ross, and the vacancy thus caused in the office of Surgeon-General of British Guiana, Dr. J. E. Godfrey, who for the past six years has been the Medical Inspector of that colony, has been promoted to the higher office. He entered the service of British Guiana in 1883, and has already acted as Surgeon-General on several occasions.

Literary References.

TROPICAL DISEASES.

MALARIA.

Bartle, I. B. Malarial Fevers as seen by the Eye of the General Practitioner, *Oklahoma M. News Jour.*, 1904, vol. xii., p. 31.

Billet, A., and **Carpanetti, G.** Sur les culicides de la ville de Bone (Algérie) et de ses environs (Aïn-Mokra, &c.); leur relation avec le paludisme de cette région, *Bull. méd. de l'Algerie*, Algiers, 1904, vol. xv., p. 19.

Boyce. The Effects of the Anti-malarial Campaign at Ismaila. JOURN. TROP. MED., London, 1904, vol. vii., p. 75.

Bruce, D. Dum-Dum Fever, *Journ. Roy. Army Med. Corps*, London, 1904, vol. ii., p. 207.

Cardamatis, J. P. Les épidémies des fièvres palustres à Athènes, leurs causes et les théories d'Hippocrate; le moustique est-il le seul facteur du paludisme? La source principale du miasme est-elle connue ou non? *Rev. méd. de l'Afrique du nord*, Algiers, 1904, vol. vii., p. 7.

Cartier, E. Observation d'un malade atteint de paludisme et du boutons de Biskra, *Lyon méd.*, 1904, vol. cii., p. 356.

Corsin, I. Un cas de enteroragie datorit cu probabilitate paludismului, *Spitalul.*, *Bucurescĭ*, 1903, vol. xxiii., p. 895.

Dalgetty, A. B. Canine Malaria, JOURN. TROP. MED., London, 1904, vol. vii., p. 67.

Engman, M. T. Paludides, with the Histo-Pathology of a Case of Malarial Purpura, *Tr. Am. Dermat. Ass.*, New York, 1903, p. 192.

Goltman, M. A Few Remedies other than Quinine in the Treatment of Malaria, *Therap. Gaz.*, Detroit, 1904, 3 s., vol. xx., p. 14.

Grassi, B. Come si propaga la malaria, *Atti . . . r. Ist. Lomb. di sc. e lett.*, Milan, 1903, vol. xviii., p. 1, 1 pl.

Grawitz, E. Bermerkungen zu dem Artikel über: Die basophilen Körnungen im Blute Malariakranker und ihre Bedeutung, von Moritz Silberstein, *Centralbl. f. Bakteriol.*, *&c.*, 1 Abt., Jena, 1903-4, vol. xxxv., p. 593.

Harris, S. The Treatment of Remittent and Intermittent Fevers, *Therap. Gaz.*, Detroit, 1904, 3 s., vol. xx., p. 1.

Hemmeter, J. C. Chronic Malaria, Complications and Sequelæ with Reference to Digestive Complications, *Tr. Nat. Ass. U.S. Pension Exam. Surg.*, Rochester, N. Y., 1903, vol. i., p. 104.

Kavaleroff, I. N. Action of Adrenalin in Malarial Fever, *Vrach. Gaz.*, St. Petersburg, 1904, vol. xi., p. 33.

Krauss, W. The Treatment of Intermittent and Remittent Fever, *Therap. Gaz.*, Detroit, 1904, 3 s., vol. xx., p. 6.

McElroy, J. B. Treatment of Intermittent and Remittent Fever, *Therap. Gaz.*, Detroit, 1904, 3 s., vol. xx., p. 10.

McLaughlin, J. W. The Treatment of Malarial Hæmoglobinuria with Quinine, *Therap. Gaz.*, Detroit, 3 s., vol. xx., p. 24.

Malakates, S. I. Μελέτη ἐπὶ τῶν ἐν Ἁλμυρῷ τῆς Θεσσαλίας ὑφεσίμων καὶ συνεχῶν ἑλειογενῶν, πυρετῶν. Ιατρικὸς μηνύτωρ, Ἀθῆναι, 1903, vol. iii., p. 199.

Mallannah, J. An Interesting Case of Hæmoglobinuric Fever, *Indian Med. Rec.*, Calcutta, 1903, vol. xxiv., p. 1337.

de Meirelles, E. Impaludismo, *Rev. da Soc. de med. e cirurg.*, Rio de Janeiro, 1903, vol. vii., p. 412.

Moore, J. T. Substitutes for Quinine in the Treatment of Malarial Fever, *Therap. Gaz.*, Detroit, 1904, 3 s., vol. xx., p. 23.

Ostapchuk, V. S. Natural Malarial Fever Infection in the Military Hospital in November, *Russk. Vrach.*, St. Petersburg, 1904, vol. iii., p. 89.

Patrón, A. Una forma desconocida ó rara del paludismo larvado, *Gac. méd.*, Mexico, 1903, 2 s., vol. iii., p. 348.

Pijoan, B. Presencia del género anopheles en los focos palúdicos de la línea de ferrocarriles de Madrid á Zaragoza y Alicante (Red Catalana), *Arch. lat. de med. y de biol.*, Madrid, 1903, vol i., p. 98.

Pittaluga, G., *et al.* Resumen de las observaciones y resultados del experimento de profilaxis medicamentosa contra la infección palúdica en Navalmoral de la Mata, Talayuela, Talavera la Vieja, &c. (cáceres), *Arch. lat. de med. y de biol.*, Madrid, 1903, vol. i., p. 89.

Plehn, A. Die Ergebnisse der neuesten Forschungen auf dem Gebiet der Malariaepidemiologie, *Arch. f. Hyg.*, München and Berlin, 1904, vol. xlix., p. 1.

Pulstinger. Ueber das Verschwinden der Malaria in Germersheim, *Munchen. med. Wchnschr.*, 1904, vol. ii., p. 207.

Red, S. C. The Treatment of Malaria in Children, *Therap. Gaz.*, Detroit, 1904, 3 s., vol. xx., p. 26.

Rivers, J. H. Report of Blackwater Fever in the Soudan, *Journ. Roy. Army Med. Corps*, London, 1904, vol. ii., p. 156.

Rowley, Mary E. Some Unusual Forms of Malarial Parasites, *Johns Hopkins Hosp. Bull.*, Baltimore, 1904, vol. xv., p. 22, 1 pl.

Russell, F. F. The Results of Two Seasons' Anti-malarial Work, *Journ. Ass. Mil. Surg.*, Carlisle, Pa., 1904, vol. xiv. p. 157.

Shropshire, W. The Use of Quinine in Malarial Hæmoglobinuria, *Therap. Gaz.*, Detroit, 3 s., vol. xx., p. 25.

Stanwood, E. Suppression of Malaria on the Isthmus, *Med. Rec.*, New York, 1904, vol. lxv., p. 309.

Trolard. Etiologie de la malaria; proposition d'une expérimentation, *Bull. méd. de l'Algérie*, Algiers, 1904, vol. xv., p. 28.

Waters, E. E. Malaria, as seen in the Andamans Penal Settlement, *Indian Med. Gaz.*, Calcutta, 1903, vol. xxxviii., pp. 419, 444; 1904, vol. xxxix., p. 5, 1 pl.

West, H. A. The Treatment of Malarial Fever, *Therap. Gaz.*, Detroit, 1904, 3 s., vol. xx., p. 16.

Yada, T. The Present Position of Blackwater Fever in Taichu, *Iji Shinbun*, Tokio, 1903, p. 1623.

BERI-BERI.

Casey, J. P. N. An Epidemic of Beri-beri in St. Helena, *South African Med. Rec.*, Cape Town, 1903, vol. i., p. 107.

Durham, H. E. Notes on Beri-beri in the Malay Peninsula and on Christmas Island (Indian Ocean), *Journ. Hyg.*, Cambridge, 1904, vol. iv., p. 112, 1 pl. on 2 l.

Some Notes on the Urine in Beri-beri, *Brit. Med. Journ.*, London, 1904, vol. i., p. 480.

Guérin, L. E. Nouveau traitement du béri-béri, *Caducée*, Paris, 1903, vol. iii., p. 291.

Ichihara, N. Two Cases of Peculiar Defects of the Field of Vision in Beri-beri, *Nippon Gankwa Gankukwai Zasshi*, Tokyo, 1903, vol. vii., p. 916.

Jubb, A. A Case of Acute or Pernicious Beri-beri, *Brit. Med. Journ.*, London, 1904, vol. i., p. 835.

Komoto, J., and **Aoki, T.** Central Scotoma in Beri-beri (Ref. No. 1, pt. 2, 10), *Shinkeigaku Zasshi*, Tokio, 1903, vol. ii., p. 170.

The Central Scotoma in Kak'ke, *Sei-i-Kwai M. J.*, Tokio, 1903, vol. xxii., p. 109.

Laoh. Jets over de aetiologie, prophylaxis en therapie der beri-beri. Bijdrage tot de kennis der infectie-ziekten, Batavia, 1903, G. Kolff and Co., 114 pp., 8vo.

Nadam, C. K. R. Diagnosis of Beri-beri, *Indian Med. Rec.*, Calcutta, 1903, vol. xxiv., p. 1157.

Nocht. Sur le béri-béri des voiliers, *Caducée*, Paris, 1904, vol. iv., p. 87.

Okada, E. Renaut's Corpuscles in the Peripheric Nerves in a Case of Beri-beri, *Shinkeigaku Zasshi*, Tokio, 1903, vol. ii., p. 130, 1 pl.

Sakaki. Récherches sur le poison du riz dans l'étiologie du béri-béri, *Caducée*, Paris, 1903, vol. iii., p. 278.

Takasu, H. Remarks on Armpit Blood taken from a Beriberi Patient, *Chiugai Iji Shinpo*, Tokio, 1903, pp. 1153, 1225.

Wakii, S. The Influence of Beri-beri on the Kidneys, *Igaku Chuwo Zasshi*, Tokio, 1904, p. 1291.

Ueber den Hautreflex bei Kakke (Ausz. Hft. 14), Japanese text, *Mitt. d. med. Gesellsch. zu Tokyo*, 1903, vol. xvii., pp. 618, 679.

Watercress as a Specific for Beri-beri, *Lancet*, London, 1904, vol. i., p. 521: also (Abstr.) Journ. Trop. Med., London, 1904, vol. vii., p. 57.

EXCHANGES.

Annali di Medicina Navale. Annali d' Igiene Sperimentale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal, Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Medical Gazette. Indian Medical Record. Interstate Medical Journal. Janus. Journal of the Royal Army Medical Corps. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Transactions of the American Microscopical Society. Treatment.

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Original Communications.

BACTERIOLOGY OF PARANGI (YAWS).

By Eugene Ellis Modder, L.F.P. & S., G.L.M.
Assistant Colonial Surgeon, Ratnapura, Ceylon.

Various writers on yaws who have made a bacteriological study of the disease have written on the subject. Pieresz, so long ago as 1890, spoke of the existence of a micrococcus in the yaws tubercle. Nicholls, in his report on yaws in Tobago, Grenada, St. Vincent, St. Lucia, and the Leeward Islands, addressed to Her Majesty's Secretary of State for the Colonies in 1895, states that he found a micrococcus constantly present in the granulomata which he considered characteristic of yaws. Powel, in 1896, noticed in two cultivations a certain yeast whose cells lay in the granulomata.

Dr. J. M. H. Macleod, Assistant to the Dermatological Department, Charing Cross Hospital Medical School, in the Section on the Dermatological Department, British Medical Association, makes the following observation: "A search for a specific microbe in the section proved futile. An examination for new micro-organisms in the section of tissues is unsatisfactory at any time, and in the skin this is even more markedly the case. We had no difficulty in finding micro-organisms in the horny layer in a number of sections which we stained in divers ways for the purpose, but we found types we could not distinguish in their appearance from those which occur in the normal epidermis, such as cocci, diplococci, sarciniæ, and a few short bacilli; we failed to find the yeast fungus of Powell, and without cultivation experiments were unfortunately unable to verify the frambœsiform bacillus of Breda or the micrococcus of Nicholls."

The Parangi disease of Ceylon, the yaws of the West Indies, the Brazilian frambœsia of Professor Breda, I think, are identical diseases, and I hope a few observations which I have made in Ceylon may be of use to my professional brethren elsewhere. I have made a series of cultivations from the secretions of the tubercles of Parangi, and in every case succeeded in growing a micrococcus, which I succeeded in cultivating in neutral gelatine up to the third generation. The growth was rendered diffluent on the surface, and afterwards formed a greyish film. In sterilised broth the growth became turbid and the cocci well marked. In making these observations, I noticed that the micrococcus could only be grown in acid media, and whenever the reaction was alkaline the growth ceased. It occurred to me that the bacillus of Parangi having failed to grow in alkaline media, of applying alkalies to some of the granulomata, and in a very short time I was convinced of its usefulness. The experiment was tried, and in every instance the granulomata disappeared. A few examples I beg to furnish which will prove my contention. I have not been successful in transmitting the disease to chickens, dogs, or even calves, although every possible care and precaution was taken by me in my experiments.

A statement which I annex will show the observations which I made concisely.

(1) Lappaya, Sinhalese boy, aged 12, admitted to hospital January 12th, 1903; discharged March 30th, 1903. A boy of the cultivator caste, born at Hettipolla, where he spent most of his time. Contracted a sore on the left leg when working in a field. It continued for six months, followed by an attack of fever, when the whole body was covered with a pustular eruption. On admission the granulomata were found most prominent about the flexures, face and trunk. Patient was put on soda bicarb., 20 grs., three times a day, and a lotion of soda bicarb., 10 grs. to 1 oz., locally. March 30th, left hospital perfectly cured.

(2) H. L. A., Eurasian boy, aged 14, admitted to hospital January 12th, 1903. This boy contracted a sore on his leg by a scratch with a piece of broken bottle. Three months after developed a pustular eruption; some of the pustules were as large as a ten-cent piece. The whole body was covered with the eruption. Put on soda lotion and powders; three months after every trace of the disease disappeared; was regularly seen for two years after; he never had so much as a trace of the disease.

(3) Mali, Sinhalese boy, aged 14, admitted to hospital June 25th, 1903. This boy contracted a sore on his left foot at root of great toe, by a leech bite; treated with ordinary medicines by native medical men till two and a half months ago, when a vesicular eruption appeared which gradually became pustular, and covered the whole face, armpits, groins and genitals, and a number of them appeared round the margin of the anus, and a regular ring formed round the mouth. He was placed on alkaline treatment. In six weeks every trace of the eruption disappeared. He was placed for a further period of six weeks under observation, and left the hospital cured. He was again seen after two years, without a trace of the disease.

(4) Muttusamy, Sinhalese man, aged 35, admitted to hospital June 14th, 1903. The patient was by occupation a coolie in the irrigation works; contracted a sore in his leg when working in a paddy field; the eruption appeared two and a half months after the sore. The whole body was covered with pustules, some of them were ulcerating. The secretion was rather profuse and irritating. He was getting feverish in the evening. He was placed on alkaline treatment with generous diet. A month after the treatment was started there was an improvement in his general condition, the scabs began to drop off and the granulomata to disappear. In fourteen weeks the eruption had disappeared and there were only pigmental scars left in their places. After a further course of treatment for another month the patient left the hospital. He was asked to show himself regularly and to make sure that there was no relapse.

(5) Ukku, Sinhalese woman, aged 30, admitted to hospital January 15th. A fairly well-nourished woman. When nursing her child, with Parangi, contracted a sore on her breast. It ran its usual course and was followed by a pustular eruption covering the whole body. The infant in arms had a tubercle on the lower lip, which part came in contact with the breast, from which most probably the secretions came in contact with the sore. Both mother and child subjected to the treatment. The child was the first to show signs of improvement. In the course of fourteen weeks

every trace of the disease had disappeared. The initial sore in the case of the infant was found in the margin of the prepuce, and was brought on by coming in contact with the body of the sister who had the disease.

[This article was received printed, and without stating if it had appeared elsewhere.—Ed. *J.T.M.*]

NOTES FROM SIERRA LEONE.

Case of Gondou or Anakhre, Reported by Dr. W. Renner, Sierra Leone.

In January, 1900, I reported and illustrated by photograph the above case of L. S. in this Journal. I am again reporting on the same case after an interval of four years, and showing by photo illustration also, the changes which have occurred in the case. Those who are in possession of the January number for 1900 would be able to see that there has been an increase of growth in the eminences, especially in that of the left side of the nose. They are above the size of a pigeon's egg and are a source of obstruction to the field of vision on the inner sides and downwards. The patient has now a distinct nasal accent in his speech and has had occasional pains in the bony mass. He admits of having had yaws as a child. This statement would lend support to the theory advanced by Dr. A. J. Chalmers, of the Gold Coast Medical Service, that this may probably be a late manifestation of yaws. His facts are, however, not sufficiently conclusive. I have had for years opportunities of seeing hundreds of cases of yaws in children and adults, and in the later period of their life I have not seen any sign of the condition which is described under the term Gondou, although I have resided in and visited districts in this colony where yaws is endemic; for the children and others are made to associate with each other so that those who have not had the disease may have it as a preventative, as their parents believe, from other diseases.

PROPHYLAXIS OF MALARIA.

By Dr. Antonio Mori.

Campiglia Marittima, Pisa, Italy.

The result of recent investigations respecting malaria has been the discovery of the evolution of the hæmosporidium and the method of its transmission from an infected to a healthy person; this discovery has naturally produced a modification in the prophylactic treatment of this disease which incapacitates such a number of people, especially country labourers, and which claims a by no means indifferent number of human lives (directly or indirectly) by the profound anatomo-pathological changes caused in the most important tissues of the system.

It is distinctly proved that there exist two kinds of careers for the malaria parasite; one of an asexual form, destined to multiply in man and other animals, the other of a sexual character, destined to reproduce the species after fecundation has taken place in the intestines of the particular mosquito. It has further been demonstrated beyond question that it is the mosquito of the genus *Anopheles* which is the chief, if not the only, medium of malaria transmission. "Malaria," therefore, does not exist in the strict sense of the word, or the meaning which used to be associated with it; what does exist are the malaria germs that live in the Anopheles for a certain period in the year, and in man all the year round. Malaria is not dependent on conditions of soil in any given district; but these conditions are of importance as to how far they render the life of the mosquitoes possible and favour their development. At the time when the nature of the soil and the waters under and overground were looked upon as the principal factors in malaria, attention was given to the improvement of the soil through suitable cultivation of the land and regulation of waters, whilst prophylaxis was quite neglected and the doctor looked upon a malaria sufferer in the light of an ordinary patient instead of that of a source of fresh infections for a certain zone. The improvement of the soil forms part of anti-malarial prophylaxis also at the present day, although with a different purpose; whilst it was formerly attempted to modify the conditions of soil in order to render it less favourable for the development of one of the chief factors in malaria, the mosquito, modern hygiene follows further aims of no less importance. We try to hinder the development of the Anopheles in a certain region during the period favourable for their growth; to prevent the Anopheles feeding on the blood of malaria-infected persons and subsequently transferring the disease to healthy people by stinging them; to look after the malaria patient in order to obtain his complete cure and also prevent his becoming a centre of fresh infection. For this last reason Loriga proposed, not long ago, to isolate persons suffering from malarial fever until their cure is definitely established.

To prevent the development of the Anopheles it was attempted to destroy their ova and larvæ in the stagnant waters, and to kill the grown-up insects in the places where they generally live. Professor Celli, with the aid of Dr. Cassagrande, instituted a number of experiments and conducted them with a number of substances without finding a single one to efficiently destroy the ova and larvæ of these insects. Fermi employed petroleum, a measure which had already been proposed in America. He introduced petroleum into the pools and perennial marshes during five or six months of the year twice monthly. In this manner he was able to obtain the destruction of the Anopheles larvæ in the island of Asinara, and also in the town of Sassari, after having found out all the breeding grounds of the mosquitoes. He obtained the most excellent results. Also sea-water has given splendid results and has been used around the salt-pits of Corneto and in the littoral of Pekin.

To kill the insects many substances have been experimentally used; one of the best, according to Celli, is "zanzolina," a mixture of larvicid, picked flowers of crysanthemums and valerian root. Fermi, in his experiments at Sassari, used chlorine in order to kill the mosquitoes in stables and cellars, using other insecticides for inhabited houses. In recent times, however, the greater importance of the disinfection of man has been recognised.

Fermi, starting from the fact that there are some, although few, animals and also human beings that are

not touched by the mosquito, at first conceived the idea that it might be possible to find a substance which, ingested and subsequently exhaled by the skin, would exercise an insectifugal action; but the thought of this possibility was soon abandoned.

Dr. Calegari, in his quite recent report on the sanitary service of the China expedition says, after touching on the resistance of the Chinaman to malarial infection, that these people eat a remarkable quantity of garlic, the essence of which, subsequently eliminated by the skin, gives them a particularly acrid odour which might possibly contribute to keep the mosquitoes at a distance. Fermi then endeavoured to find a substance which, sprinkled over the clothes or rubbed into the skin, would attain this object; a substance having an action of at least ten to sixteen hours' duration, and being at the same time innocuous to the organism, without objectionable smell, easy of preparation, not costly and not smeary. With this object he experimented with various animal and vegetable fats, all essences, the various vegetable infusions and powders, various waters, secretions, animal excretions and extracts, but of 400 substances only a few were able to keep the mosquitoes off during one or two hours. Malarial prophylaxis by means of insectifuges may therefore be dismissed.

Excellent results, however, have constantly been obtained by a mechanical protection of man. In this connection I recall the French campaign in Madagascar, when, following the advice of Pasteur, metallic netting lined with cotton was used to protect the face. Beyond this, the object, however, was to prevent the penetration into the organism of the malarial germs carried by the air into the mouth and nasal canals.

Now, in 1899, Celli tried the first experiences of mechanical protection on various railway employés on the Roma-Tivoli line between Prenestina and Cercara, his experiments lasting from July to November. These demonstrated that by the prevention of the ingress into the houses of the mosquitoes by means of metallic netting fixed to windows and doors, and by protection of parts of the body of such individuals as are obliged to be out in the open, especially in the first hours of the morning and evening, immunity from malaria is ensured. These results were confirmed by many other similar experiences by Grassi and Celli on other railway lines, of which we will only mention the principal ones: Eboli, Battipaglia, Pontegalera, Azio and Terracina to Di Mattei; Sicule Railway to Baldi, Roma-Tivoli, Fermi and Cao, Feroni and Procaccini, Martirano, Ricchi.

The results were always excellent, only Annet, Button and Eliott say that the network is insufficient for the purpose, and Mariotti Bianchi pronounces the mechanical protection to be absolutely ridiculous. It is, however, to be well observed that also these experimenters do not combat the principle, but merely fear the difficulties which present themselves in practice, and prevent them from attaining their object.

To Professor Celli we also owe the first experiment to impart artificial immunity to man. The illustrious hygienist studied the action of the serums of malaria sufferers and animals congenitally immune from malaria. He prepared the liquid of many mosquitoes of the *Culex* genus and of infected and non-infected Anopheles, and therewith practised inoculations, and had recourse also to opo-therapy, but all the results were negative. Prophylaxis by medicaments, however, proved very successful; methylene blue, arsenic, quinine and iron, administered singly or in different combinations, were the most frequently used substances and served the purpose best. Methylene blue was, however, soon abandoned, although it was at first praised as a precious anti-malaricum. Also Celli dismissed it as a prophylactic because it gave negative results in an experimental case of grave tertian fever, while its preventive efficacy was to be determined. Furthermore, it is not only that its value in the actual infection is still doubtful, but its administration is apt to produce non-negligible inconveniences in the organism. The therapeutic value of methylene blue was recently investigated by De Blasi in 100 cases of malarial infection, and this is the verdict which he pronounces: "It is my conviction that in many cases methylene blue cures malarial fever, and also prevents relapses, but I am far from desiring to affirm this in an absolute manner." The author then proceeds to enumerate the defects. To begin with, everything proves that methylene blue does not possess that tonic and reconstituting action of quinine in cachectic individuals whose fever is to be arrested; it does not induce quick and important improvement of the general condition. In acute cases there is not always that relative sensation of well-being and tonification of the whole organism which is generally experienced with quinine. Furthermore, generous doses, like 1 gramme per day, produced symptoms of general debility necessitating a reduction of the doses. For the last reason it is clear that a prolonged cure, as occurs in malarial prophylaxis, cannot be continued without combating the fairly grave phenomena of intolerance.

Arsenic has given more satisfactory results. Tomasi-Crudeli was the spokesman for arsenical prophylaxis, believing the drug to possess an immunifying value. Ricchi experimented with arsenic on a large scale on the railway *personnel* of the Adriatic lines, renewing his investigations in 1898 in various affected localities along the same line with satisfactory results, The continued administration for a fairly long time was, however, especially in the summer, not tolerated by all patients, and also frequently produced gastro-enteric disturbances.

During the anti-malarial campaign of 1901, Celli endeavoured to repeat the experiments with the organic form of sodium cacodylate, which he administered in a very palatable liquid. The results, were, however, little satisfactory, as in forty-three persons subjected to the cure there was a percentage of 34·7 of relapses and fresh malaria cases, although the year in question was a comparatively mild one for malaria.

Quinine, which has always been the best reputed medicament against malarial infection, has remained the one with the best prophylactic results. From the time of the American War the regimental doctors used it for preventive purposes. Warren, in 1866, and Samuel Lougan, in the same year, recognised its beneficial effects. It was likewise largely used by the colonists in Africa and the Dutch Indies; it also answered well in the French Madagascar campaign,

and at a meeting of the Medical Academy in Paris, Heurot, during a discussion on the point at issue, called quinine an admirable antidote for malaria. Worrus attributed to it a preventive action, and Laveran also recommended its use.

The reports of the English Scientific Mission recently also recognised the indisputable efficacy of quinine. If certain observers in the past had their doubts about its prophylactic value, like Lanceraux, Bardet was also able to refute their statements with the observation that possibly not all the fevers supposed to have been of malarial origin were in reality of such origin.

Gilblas made comparative experiments between mechanical protection and prophylaxis by medicament. He used arsenical liquor, oxalate of iron, hydrochlorate of quinine, and came to the conclusion that mechanical protection is far superior to a chemical prophylaxis, as of 114 protected persons only five had fever, whilst of 469 persons subjected to cure 228 fell sick. Without emphasising that the comparative experiments by Celli have given entirely different results, we should mention that Gilblas began the prophylaxis by medicaments after the first days of September, when the infection had already spread; that he did not employ an uniform remedy, and that, as he reports, the individuals experimented on did not lend themselves well to the cure. For the rest the experiences of Celli, who used either euquinine or the common salts of quinine, are sufficient to confirm the prophylactic value of this remedy. Much less encouraging, however, were the results obtained with a mixture of iron, arsenic and quinine. More even than from Gilbert's experience is this evident from the experiments instituted by Dr. Vivenza at Grezzana. The latter experimented with two different groups of the same population, and with hydrochlorate of quinine had 2·85 per cent. of relapses, and 2·85 per cent. of new cases. Amongst the individuals who took the mixture there were 17·5 per cent. of relapses and 12·50 per cent. of new cases.

Kerschbaumer has justly remarked that the best means of prophylaxis is the destruction of the Anopheles, but as this *desideratum* cannot at present be attained, I say that medicinal prophylaxis for the unprotected country labourers, as well as all those who cannot long remain in closed rooms, is the best imaginable; and to medicinal prophylaxis I had recourse in the recent malarial season, in order to try yet another experiment.

A vast estate in the province of Grosseto, called "Castel di Pietra" (after the historical castle of Pia dei Tolomei, which the divine poet mentions in his immortal poem), was the locality chosen for our experiments. This is a zone eminently malarial, in which the sanitary conditions were up to recently due to the limited cultivation of the land (still done by antiquated methods), to the absence of canals and drains; puddles and small rivulets were very numerous, as the estate was situated between two badly banked rivers, the Cruna and the Carzia, and in various points under the level of these rivers.

The medicament employed by me was euquinine, which had already in 1900 given me the best results as a prophylactic. The action of this medicament in malarial infection is in fact truly inestimable. After the investigation of this point by Noorden, Overlach, Gover, Panegrossi, Conti, and myself, a very numerous group of authors, as Plehn, Muggia, Friedrich, Gray, Suchomlin, Fauser, Lewkowicz, Giuiew, Alexeeff, Levi, De Carlo, Sylvan and Andry, to name only a few, confirmed the therapeutical value and certain effect, declaring euquinine to be preferable to the ordinary quinine salts, as it is easily assimilable, not objectionable to the palate, and free from any unpleasant secondary effects, though it be given for a long time and in large doses. All this was known to me in 1888, when I investigated its therapeutical value in twenty cases of malarial infection. Although I gave daily doses of over 2 grammes, consumable in two hours, only very slight buzzing in the ears became noticeable, with the exception of one case, where there were also slight tremor and vomiting; but this was with an individual who had always shown absolute intolerance to quinine, and in whom the ordinary salts produced serious phenomena of cinchonism. Marchetti, who made comparative studies of the physiological action of quinine and euquinine in Professor Bufalini's laboratory, proved that the action of the latter is less depressing on the cardio-vascular system, as far as intensity as well as duration are concerned. The cause of this he sees in the ethyl radical which is a component of the euquinine molecule. Mariani, however, says that the anti-toxic influence of the ethyl is accounted for in the constant absence of disturbances of the sensory nerve centres and mesencephalon (optic nerve, tubercula quadrigemina), on which quinine acts in a pronounced measure. In cases of quinine intoxication, opium is an efficacious antagonist, but it is difficult to admit that the presence of the ethyl whose hypnotic properties are known should not to a large extent neutralise the effect of quinine on the nerve centres. In any case it cannot be denied that euquinine exercises a less noxious action on the nerve centres and on the cardio-vascular apparatus. For this and the other reasons above mentioned I have thought it convenient to give this remedy the preference.

The preventive value of euquinine against malarial infection has been fully demonstrated.

Celli had already noticed in his experiments that euquinine rendered naught the enucleation of malarial blood, and Gualdi was unable to diagnose malaria in an individual who had for several days been subjected to a preventive cure with this substance, although he showed the stings of infected Anopheles. Also Celli's experiments in the Plain of Catania and the Pontine marshes; my own in Campiere, under the valuable supervision of our illustrious hygienist of Rome; those of Mariani at Foro Appio; of Poletti at Vigasio; of the officer of hygiene to the city of Rome on the Corcollo and Castiglione estates, were all followed by the best results, and from them the prophylactic utility and absolute tolerability of euquinine is beyond doubt established.

The number of persons whom I subjected to a prophylactic cure was seventy-four; fifteen of these constituting the *personnel* of the farm, twenty-one had come from the neighbouring districts as farm labourers, and the other thirty-eight were peasants

from various parts of the estate. The anti-malarial campaign began on August 1st, and lasted to the end of October. During this period the houses were searched for mosquitoes, which were always found in large numbers, of the *Anopheles* genus—*Anopheles claviger*—as well as *Culex* genus.

The administration of euquinine took place in the morning before breakfast and before the middle day meal. The remedy was given in various forms; in flakes, as it is generally obtained in commerce, or in small tablets, suitably prepared. In order to make the administration to children easier, euquinine was suspended in syrup, but it was generally preferred in its natural state in coffee or milk. Adults preferred the form of tablets. The ordinary dose amounted to 25 centigrammes for persons not over twelve years and 50 centigrammes for adults. These daily doses had also in the experiments of the year 1900 in the Plain of Campiglia rendered good service. Only as an exception 1 gramme was given during five or six days to individuals seized by the fever after the attack was arrested. Mariotti Bianchi preferred, in his prophylactic experiments at Talamone, to give quinine in 1-gramme doses every sixth or seventh day. He obtained satisfactory results and chose this method of large doses, thinking that the effect of quinine tends rather to kill the already developed parasites than to ward off their attack.

This theory, however, is not shared by Professor Maragliano. This illustrious scientist doubts that 1 gramme of quinine is sufficient to kill the malarial plasmodium with certainty, and he says that if to-day the character of prophylactic immunification by means of small quinine doses is unknown to us, that does not mean that this mechanism is analogous to that of toxins and weakened virus. In his opinion it is rather to be supposed that the conditions are similar with quinine as with immunifying substances; all the more as it has been proved that quinine can have an agglutinating effect on normal blood corpuscles, a phenomenon which occurs in quite the same manner with immunifying processes.

I am of opinion therefore that small doses are to be preferred, not only because all symptoms of intolerance are completely avoided, but also as the daily administration introduces a quantity of quinine into the organism in which it circulates similarly as if a large quantity had been given in one dose, as Mariani expresses it. This is due to the laws regulating the elimination of the quinine salts according to the treatises by Kerner, Personne and others; of a certain quantity of quinine introduced into the organism, only part, between 10 and 30 per cent., will be excreted within twenty-four hours, whilst the excretion of the balance takes place fairly slowly during the following days.

The results of these experiments, daily superintended by Dr. Anturo Gallichi, confirmed the most favourable experience of many authors as well as our own.

Euquinine was always well tolerated. An exception was the case of a woman who experienced a sensation of heaviness in the stomach, for which reason the treatment was suspended after a few days.

The fact is worthy of attention that in the beginning we encountered four adults and one child who were already suffering from malaria. We immediately commenced a conscientious euquinine treatment, reducing the fever at once; the administration was then continued during five or six days in large doses. Then, also, these patients were subjected to the general prophylactic rules During the whole of the anti-malarial campaign no further relapses occurred. With seventy-four persons treated, only six cases of malarial infection occurred in the course of our experiments. Two of these, however, disobeyed the rules which had been laid down, one fell sick twenty-one, and the other twenty-six, days after the commencement of the experiments. Both had left the estate and been without euquinine for seven or eight days. On their return they received suitable treatment and soon lost their fever, as also did the other four patients. Prophylaxis was recommenced and proved generally very efficient. I should add that malaria this year was fairly mild in the marshland, as well as other districts of Italy. Nevertheless, many cases of malaria were observed in the villages abutting on the Pietra Estates.

THE TREATMENT OF DYSENTERY.

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A rational discussion of the treatment of dysentery postulates a recognition of the fact that this is a multigenerous disease, and that while some measures are of general utility in the treatment of all its varieties, others, having a more specific character, are of value only in one or two. A classification of such varieties is therefore a preliminary step of imperative importance. Its bases should be the etiology and pathology of these varieties and the clinical course which each pursues.

While our knowledge of the etiology of dysentery is as yet incomplete, or at least unsettled, and a fully satisfactory classification of its varieties is therefore at this time impossible, we are, nevertheless, in possession of enough facts to justify an attempt towards this end, and this will here be made.

Two sharply-defined varieties may be distinguished, one caused by the *Bacillus dysenteriæ*, the other supposed to be caused by the *Amœba dysenteriæ*. Clinically, each of these is capable of division into two sub-varieties—acute and chronic. In addition to these, having the etiological and pathological characteristics of both the bacillary and amœbic types, but generically distinct from either, must be noted mixed infections by both these organisms. Cases of this variety may also be classified as acute or chronic. This discussion of the treatment of dysentery will therefore take cognisance of six varieties of the disease; but a word in support of the classification here adopted is considered expedient in passing.

The pathogenicity of the *B. dysenteriæ* is now, I believe, generally accepted. Two types of this organism are now recognised—the alkali-producing (Shiga's

Case	Duration of illness	Nature of onset	Normal weight	Weight on entering hospital	Weight gained during stay in hospital	Diet while in hospital	Average number of stools daily on admission	Character of stools on admission	Number of stools daily after treatment described below	Character of stools after treatment described below	Variety of baccilus agglutinated	Intensity of agglutination	Pathogenic organisms found in stools
I.	$4\frac{1}{2}$ years	Acute	160 lbs.	140 lbs.	18 lbs.	Liquid Special Full	5	Partly formed	1	Formed	Acid	1 : 16 in 10 minutes 1 : 25 in 20 ,, 1 : 50 in 45 ,, 1 : 100 in 1 hr. 30 min. 1 : 500 no agglutination in 2 hours	*Amœba dysenteriæ* scant
II.	$2\frac{5}{12}$ years	Acute	153 lbs.	125 lbs.	13 lbs.	Liquid Light	7	Liquid, or partly formed	2	Variable, usually semi-formed	Acid	1 : 16 in 10 minutes 1 : 25 in 20 ,, 1 : 50 in 1 hr. 30 min. 1 : 100 no agglutination in 2 hours	*Amœba dysenteriæ* abundant *Baccilus dysenteriæ* (acid type)
III.	$5\frac{3}{12}$ years	Subacute or chronic (information on this point indefinite)	180 lbs.	152 lbs.	9 lbs.	Liquid Light Special	8	Liquid, or partly formed	3	Variable, usually formed	Acid	1 : 16 in 10 minutes 1 : 25 in 20 ,, 1 : 50 in 1 hr. 40 min. 1 : 100 no agglutination in 2 hours	*Amœba dysenteriæ* very abundant *Trichomonas intestinalis* very abundant
IV.	$1\frac{4}{12}$ years	Acute	176 lbs.	137 lbs.	23 lbs.	Liquid Special Full	8	Liquid, or partly formed	1	Formed	Acid	1 : 16 in 20 minutes 1 : 25 in 30 ,, 1 : 50 in 35 ,, 1 : 100 in 45 ,, 1 : 500 in 2 hours 1 : 1,000 no agglutination in 2 hours	*Amœba dysenteriæ* abundant
V.	$2\frac{7}{12}$ years	Acute	165 lbs.	155 lbs.	11 lbs.	Special Full	6	Partly formed	1	Formed	Acid	1 : 16 in 30 minutes 1 : 25 in 45 ,, 1 : 50 in 1 hr. 45 min. 1 : 100 no agglutination in 2 hours	*Amœba dysenteriæ* scant
VI.	$3\frac{11}{12}$ years	Acute	155 lbs.	126 lbs.	10 lbs.	Liquid Light Full	7	Liquid, or partly formed	2	Formed	Acid	1 : 16 in 20 minutes 1 : 25 in 40 ,, 1 : 50 in 1 hr. 15 min. 1 : 100 in 1 hr. 45 min. 1 : 200 no agglutination in 2 hours	*Amœba Dysenteriæ* scant
VII.	$1\frac{11}{12}$ years	Acute	168 lbs.	132 lbs.	21 lbs.	Liquid Special Full	14	Liquid	1	Formed	Acid	1 : 16 in 15 minutes 1 : 25 in 25 ,, 1 : 50 in 45 ,, 1 : 100 in 1 hr. 30 min. 1 : 200 in 2 hours 1 : 500 no agglutination in 2 hours	*Amœba Dysenteriæ* abundant

Treatment previous to entering hospital	Result of previous treatment	Treatment employed in hospital	Quantity of serum employed, 10 cc. given at each injection	Result of treatment received below	Duration of treatment in hospital	Remarks
Bismuth, Dover's powder, olive oil, enemata of quinine and hydrozone	Periods of temporary improvement	Antitoxin subcutaneously, cupri arsenitis by mouth, enemata of eucalyptol, eucalyptus gum, and ol. olivæ	40 cc.	Recovery	2 mo.	
Salol, camphor, opium, olive oil, enemata of silver nitrate, hydrozone, iodoform and quinine	Periods of temporary improvement	Same as in Case I.	50 cc.	Improvement, slight	2 mo.	Solitary abscess, left lobe of liver, opened 1 year prior to admission ($1\frac{1}{8}$ pints pus). Recovery from operation uneventful.
Salol, bismuth, pepsin, strychnia, quinine, enemata of hydrozone, silver nitrate, ipecac., quinine, tannic acid, and tincture opium	Periods of temporary improvement	Same as in Case I., enemata ol. gaultheriæ also given	50 cc.	Improvement, marked	2 mo.	
Elixir iron, quinine and strychnia, brandy, camphor and opium enemata of ice-water, quinine, and silver nitrate	Periods of temporary improvement	Antitoxin subcutaneously, enemata of eucalyptol, eucalyptus gum and ol. olivæ	50 cc.	Recovery	2 mo.	Was suffering with acute lobar pneumonia when admitted, and weight not taken until he was convalescent. Recovery from this disease accounted for a part of his increase in weight. His blood examination, after receiving 50 cc. of serum, was as follows:— Reaction with acid type, 1 : 500 in 2 hours. 1 : 1,000 no agglutination in 2 hours. Reaction with alkaline type, 1 : 25 in 2 hours. 1 : 50 no agglutination in 2 hours.
salol, bismuth, Dover's powder (during acute exacerbation), and pepsin, enemata of starch, quinine and silver nitrate	Periods of temporary improvement	Cupri arsenitis by mouth, enemata of eucalyptol, eucalyptus gum	None employed	Recovery	2 mo. 2 da.	
bismuth, ipecac., pepsin, olive oil, enemata of quinine and tannic acid	Periods of temporary improvement	Cupri arsenitis by mouth, enemata of eucalyptol and eucalyptus gum	None employed	Recovery	$1\frac{1}{2}$ mo.	
Potassi et sodii tartrate and magnesium sulphate, enemata of quinine, tannic acid, and salt solution	Periods of temporary improvement	Same as in Case I.	40 cc.	Recovery	$1\frac{1}{3}$ mo.	

bacillus) and the acid-producing (Flexner's bacillus). The term bacillary itself is therefore generic, inasmuch as it designates a variety of the disease which may be caused by either of two closely-related, but not identical, organisms.

While the pathogenicity of the *A. dysenteriæ* cannot be regarded as satisfactorily established, its almost invariable association with one variety of dysentery, and the pathological conditions with which it has been found associated, furnish strong ground for its provisional acceptance as a cause of the second variety of the disease. Such acceptance is by no means final, but is justified to a degree by both laboratory research and clinical observations, and will be followed here.

Mixed infections by both these organisms, the *B. dysenteriæ* and the *A. dysenteriæ*, constitute a third variety of dysentery, one of great importance, but seldom recognised. Cases have been mentioned by Curry, Strong and Musgrave, in the Philippines, and by other observers in the United States, but it is not generally appreciated how frequently these are met with in practice. This is especially true of those following a chronic course, for in these cases the bacillus is found in the stools only when the disease is undergoing an exacerbation, and examinations made for it at other times (almost invariably with negative results) have led to erroneous conclusions. This fact, and its discovery *post mortem* in the intestinal walls, in cases of this class, would indicate that this bacillus, like the amœba, may there remain quiescent until some unfavourable circumstance arouses it to increased activity.

The results obtained from an examination of the stools in one case of dysentery and of the blood in seven cases, which I recently had under treatment at the Army General Hospital in Washington, illustrates this occurrence of mixed infections with a fair degree of certitude. These patients had reached me with a diagnosis of chronic amœbic dysentery. The amœbæ were found in their stools without difficulty, but because of the comparative quiescence of these cases at the time the examinations here reported were made (October, 1903), stools of only two of them were examined for the *B. dysenteriæ*. One examination was negative (Case 7), the other (Case 2) was positive. It will be noted that the case in which it was positive is the only one in the series which gave a history of hepatic abcess. The blood examination (tabulated below) gave in all cases a positive Widal reaction with the acid type of the bacillus. Tests with the alkaline type were uniformly negative.

Of five control cases, four were negative and one gave a faint reaction with the acid type, *i.e.*, an agglutination in two hours with 1 : 10 dilution. The blood examinations were made for me in the laboratory of the Army Medical Museum, by Dr. Tayler-Jones, who enjoys a most enviable reputation for scientific accuracy, and whose report I regard as thoroughly reliable.

While the obtainance of the Widal reaction in these cases cannot be regarded as proof of an infection actually existent at the time these examinations were made, its intensity indicates that such infection had probably occurred, and further that it was of comparatively recent date, or was latent. The histories given support the belief that latency was the true explanation, for all of these patients had for a year or more been living in the temperate zone, had taken excellent care of themselves during that period, and had been comparatively free from acute manifestations of the disease. It will be remembered that the reaction disappears, as a rule, within a few months after the bacillus is eliminated.

In regard to pathology as a basis of this classification of dysentery, the recent discovery of *B. dysenteriæ* in cases of the catarrhal, diphtheritic, and so-called malignant types, would indicate that these are due to infection by this organism, and that the respective pathology and symtomatology in such cases is dependent, at least in large degree, upon the intensity of the infection. The pathology of acute and chronic bacillary dysentery, acute and chronic amœbic dysentery, and acute mixed infections, has been elucidated, and warrants their recognition as distinct types, whether their respective causes be considered demonstrated as yet or not. Only a few *post mortems* of chronic mixed infections have been made, and while these are not sufficient, numerically, to give it as positive support as the other varieties possess, they are confirmatory of the view here taken, that this is a separate type of the disease. The *post-mortem* reports of acute mixed affections are more numerous, and the existence of this variety better established.

Any discussion of the clinical basis of this classification is evidently unnecessary.

The dysentery-like symptoms which occasionally appear in the course of malarial infections and in scurvy are, in effect, like most cases of terminal dysentery, symptomatic, complications of those diseases in the course of which they arise, and not true dysentery. For which reason they will not be considered in this article.

In describing the methods of treatment which have proved to be of value in dysentery it is well to note (1) the general measures that are of service in all its varieties; (2) the special treatment appropriate to each.

General Management.

The preventative treatment, or prophylaxis, of dysentery, consists essentially in the usage of only that water which has been obtained from a pure source, or which has been boiled or filtered; the avoidance of any article of diet which may have been infected by being washed in polluted water, *e.g.*, lettuce; and the ingestion of no food, *e.g.*, unripe fruit, which, by causing catarrh of the stomach or intestines, may temporarily lower the vitality of those viscera, and thus permit organisms, which might otherwise have proven innocuous, to cause infection.

The best general hygienic precautions should be observed in the selection of the sites of habitations, the drainage of any moist soil adjacent thereto, the efficient disposal of all excreta, the avoidance of over-crowding, bad ventilation, over-exertion, over-indulgence of any kind, and exposure. The dejecta from any patient suffering with the disease should be thoroughly mixed with one pint of a 5 per cent. solution of chloride of lime, a 5 per cent. solution of carbolic acid, or a 3 per cent. solution of formalin,

and allowed to stand for one hour before being disposed of. If possible they should be burned or buried, and not thrown into a hopper or closet. All bed-linen should be changed daily, and whenever it becomes soiled. When removed from the bed, it should be immersed for four hours in the carbolic acid or formalin solution mentioned above, and boiled a quarter of an hour before it is washed. Bedspreads and blankets should be aired six hours daily.

Specific instructions in regard to all details of treatment should either be written out by the physician himself, or verified by him, if not dictated to a fully qualified attendant.

General Treatment of Acute Cases.

In acute cases, the patient should invariably be confined to bed, in a clean, well-ventilated room. The bedstead should be single, rather high, and the mattress should be elastic, moderately hard, and of even texture. A hair mattress, resting on a woven-wire spring, and covered with two folds of blanket, meets requirements admirably. A draw-sheet should be employed, a sheet of rubber, or, in the Tropics, linite, being placed beneath it.

The body should be sponged at intervals of from two to four hours with cold water, vinegar, or dilute alcohol, as this process both adds greatly to the patient's comfort and reduces his temperature.

The anal region should be cleansed after each dejection with a warm disinfectant solution, and if tenesmus exists, anointed at intervals with an ointment containing tannic acid (4 per cent.) and cocaine (5 per cent.).

Hot applications to the abdomen afford great relief. They may be made either in the form of fomentations, covered with oiled silk, or, what is much better, by means of the Japanese hot-boxes, containing sticks of burning charcoal, and roughly sewn to a strip of flannel.

Food should be given only in those preparations which are most easily and completely digested in the stomach, leaving the smallest amount of residue. Milk is the most suitable article of diet, for it not only contains the aliments in fairly satisfactory proportions, and therefore nourishes the patient, but under its use the number of bacteria in the stools diminishes far more rapidly than when any other food is employed. It should be Pasteurised or boiled before use. Three pints daily should be given to adults. If curds appear in the stools, it may be diluted with aërated water, or the amount reduced. Peptonised or pancreatised milk is readily absorbed, but most patients find its taste objectionable.

If milk is not well taken in any form, it may be replaced by barley-water, oatmeal-water, freshly prepared meat extracts, broths, or albumen-water. When convalescence begins, the dietary is gradually expanded, and eggs, raw scraped beef, raw oysters, fowl, raw beef and mutton are permissible, in the sequence in which they are mentioned. Gelatin and jellies may be used early in convalescence, but farinaceous foods should not be given until this is well advanced.

We may then allow milk-toast, corn starch, rice, arrowroot, sago, tapioca, and similar articles. The first ordinary vegetable that may be used is a well-baked potato. Bread should be given at first in the form of toast. The juice of ripe citrous fruits, and drinks containing vegetable acids, or less advantageously, mineral acids, may be allowed throughout the disease.

The importance of a proper dietary cannot be over-estimated. It alone, or combined with absolute rest, will in many cases ensure recovery within a few days, while failure to give it due attention, will, not infrequently, nullify all other treatment that may be employed.

As a rule, however, medication is advisable, and in severe cases is imperative. The different lines of treatment appropriate to the several types of the disease, and the drugs employed in each, are discussed below. Stimulants are practically the only drugs which may prove of service in all types of the disease. Brandy and the aromatic spirits of ammonia are the most reliable remedies of this class.

In all cases, however, medication must be supplemented by the use of injections per rectum. How rapidly these remove the infecting organisms is well shown by the observations made in one case which comes to mind, in which the number of *B. dysenteriæ* in the stools fell from 98 per cent. of all organisms therein present on the first day to 2·3 per cent. on the third day. The irrigating fluid employed in this case was normal salt solution. While receiving the injection the patient should lie on his right side or upon his back. The former position is preferable. In either case the hips must be higher than the shoulders.

The enema should be introduced (most conveniently from a fountain syringe) through a long, well-oiled rectal tube of large diameter, which is gently passed into or beyond the sigmoid flexure, *i.e.*, from 8 to 15 cm. into the bowel. The preliminary use of a cocaine suppository will relieve the pain attending the introduction of the tube. The receptacle from which the solution flows should not be more than 3 feet above the patient's bed, and the fluid should be introduced slowly for fear of perforating a thin-walled ulcer. Continuous irrigation through a double tube is occasionally employed, and gives excellent results.

Unless these precautions be sedulously observed, the use of irrigations in any form is futile. The solution may be injected cold (70° F.), tepid (90° F.), or warm (102° F.). Warm solutions are the best for routine use, but cold ones are of more service in those cases in which hæmorrhages occur.

Enemata should be given every four hours in acute cases, and from 1,000 to 2,000 cc. of fluid should be used in each injection.

For simple lavage of the colon and rectum, the best results attend the use of normal salt solution, or a 4 per cent. solution of sodium bicarbonate. To relieve tenesmus, tr. opii., gm. ii. to gm. iv., may be added to each enema, and to control hæmorrhage, the fluid extract of ergot (gm. iv. to gm. viii.), lead acetate (gm. ii. to gm iv.), or adrenalin chloride (mgm. 6·5 to 15), may be employed. The last-named drug is particularly efficacious.

Acute Bacillary Dysentery.

The specific treatment of acute bacillary dysentery is the hypodermic injection of the appropriate anti-

toxin. This should be given in doses of 10 cc. each, repeated daily or oftener if required. Unfortunately, infection by one type of the *B. dysenteriæ* is not amenable to treatment with an antitoxin developed from the other, a fact which has led to contradictory reports on the value of antidysenteric serum in general. The results obtained in Japan, however, amply prove the value of serum therapy in the type of disease there found (the alkaline type), while those following its use in the Philippines, where the acid type of organism prevails, are at least highly encouraging. Not a few sera on the market are entirely too weak to be serviceable, but we have every reason to hope that better results will be secured, when we can obtain stronger preparations, which are appropriate to the case in hand, *i.e.*, developed from the same type of organism as that with which the patient is infected.

To avoid the difficulty of determining in each case which type this may be, and which type of serum is therefore indicated for its treatment, a serum developed from both these types of bacilli—acid and alkaline—is now manufactured. Results from its use, while encouraging, are inconclusive.

My personal experience with anti-dysenteric serum, in acute cases, has been highly gratifying. In two especially severe cases (both caused by the acid type), which had failed to respond to other treatment, and which were practically moribund, the injection of 10 cc. of serum led to prompt recovery.

Of medicines given *per oram*, the saline laxatives give better results in the United States and in the Philippines than do any other drugs. Sodium sulphate, because of its action on the liver, is, perhaps, the most generally useful. It should be given in concentrated solution, in four gram doses every hour. Its use in this manner secures better results than its administration in one large dose (30 gm.) at the outset, a practice which is, nevertheless, pursued by preference by some physicians. Cinnamon-water is a good excipient. A few physicians still prefer calomel to any other laxative, giving it either in one full dose at the outset, or divided doses (mgm.) every hour throughout the course of the disease. This drug, however, is now less used than formerly, even in Germany, where better results were reported from its use than elsewhere.

If the continued use of a laxative is not deemed advisable, the administration of one in full dosage, a week or longer after the onset of the disease, frequently proves beneficial.

Castor-oil in doses of gm. viii. to gm. xvi. daily is by some regarded more highly than is any other laxative. Children are more benefited by its use than are adults.

Richmond and others have recently reported excellent results from the use of sulphur (gm. i. to gm. iv., t. i. d.), in all types of the disease. In ordinary acute cases, one and a fourth grams are given three times daily, with five grains of Dover's powder. The reports from its use are very encouraging.

Ipecacuanha enjoys the highest reputation in India and many other tropical countries, as well as in not a few localities in the temperate zone. Its usefulness in acute bacillary cases and in mixed infections is undoubted, but it appears to confer no benefit in cases of purely amœbic origin. In the United States, Porto Rico, Cuba, or the Philippines, it does not give the results obtained elsewhere—a fact possibly due to differences between the type of bacilli found in those countries and that found in India, &c.

The drug should be given on an empty stomach, in doses of from 75 cgm. to 3 gm., in bolus or mucilage. The dose usually employed is about 1·25 gm. Fifteen minutes before it is administered a mustard plaster should be applied to the epigastrium, and 2 gm. of the tincture of opium given. The patient should lie with the head low, *i.e.*, without a pillow under it, and with a cold compress over the eyes. He should not swallow the saliva which is secreted in abundance after the drug is taken. In from four to eight hours the dose should be repeated, with the same precautions to control vomiting.

If good results ensue, its use in this manner may be continued for three or four days. Ipecacuanha is especially valuable in the early stages of the disease. If it is not obtainable, the bark of the root of the caloptris gigantea (or mudar) may be employed as a substitute, in doses of from 1 gm. to 4 gm.

The oil of turpentine is highly serviceable in all cases of bacillary dysentery, especially in those where there is pronounced tympanites and great prostration. It should be given in doses of from one-fourth to one-half gram every two hours.

Opium may be necessary to relieve pain in these acute cases, but it should be given in only the smallest doses that will secure this effect. It should be administered hypodermically at regular intervals in the form of morphia. Five milligrams every three hours is usually sufficient.

The mineral and vegetable astringents are of but little value in dysentery, when given *per oram*. Excessive hæmorrhage is best controlled by ergot or adrenalin hydrochloride, either of which may be given *per oram* or *per rectum*.

Bismuth is said to yield good results in bacillary dysentery, but especially in subacute or chronic cases. It should be given alone in large doses, 1·25 gm. to 2 gm. every four hours. The salicylate and the subgallate are its most useful salts. Since it retards the elimination of the bacilli, and does not give such good results as other remedies available, I have not given it in any type of this disease for some years.

The use of intestinal antiseptics is now generally abandoned. Salol, in 30-cgm. doses every 4 hours, and hydrarg. bichloride, in doses of from $\frac{1}{2}$ to 1 mgm. every hour, are still recommended, however, by some physicians. These are of some value in cases where there is intestinal fermentation. Guiacol and beta-napthol have also been employed, but with little, if any, benefit, in the same class of cases.

Of remedies that are used quite empirically, but which are of proven value, may be mentioned cinnamon (gm. iv. to gm. vi. of the tincture, or cgm. 12 of the oil, every three hours); monsonia ovata (gm. viii. to gm. xvi. of the tincture, every four hours); simaruba (gm. 100 to gm. 150 of the wine); and cortex radicus granati (gm. 100 to gm. 150 of the wine). These two last-mentioned drugs are usually given together.

For general use, as an injection *per rectum*, in these acute bacillary cases, olive-oil gives the best results, for it is essentially sedative to the inflamed surface, and removes mucus better than does any other agent. It is difficult to obtain a pure article, most brands being adulterated with ol. sesami, ol. gossypii, &c. Because of this fact I have been compelled to employ it in limited quantity, 60 to 125 cc. per injection, suspended by recent agitation in 1,500 cc. of milk, or, better, boiled or Pasteurised therewith.

Milk alone is a homely remedy, which I have employed with distinct advantage in these cases, when olive-oil was not obtainable. Its value in these emergency cases is augmented by the addition of a small amount (3 per cent.) of egg albumen, and a faintly acid antiseptic. Potassium permanganate, gm. ½ to gm. 1 per litre, is probably the best agent of this class. The utility of olive-oil, administered in large amounts *per oram*, in either acute or chronic cases, depends almost, if not entirely, upon the fact that some of it is not absorbed, but passing through the bowel unchanged, exercises its sedative influence upon the inflamed surface with which it comes in contact. If olive-oil is not at hand, cotton-seed oil (ol. gossypii) may be used in its stead, or, if neither oil is available, milk, prepared as described above, a 1-2,000 solution potassium permanganate, a normal salt solution, or a 4 per cent. solution of sodium bicarbonate, may be given with benefit. It is possible that in cases caused by the acid type, alkaline enemata may prove of most benefit, and that in cases caused by the alkaline type, acid enemata should be used, but I have no data supporting this suggestion.

Acute Amœbic Dysentery.

In cases of this variety of the disease the same precautions as to general management and diet must be observed as in those just discussed. The only treatment *per oram* which gives benefit is eliminative. This is best secured by the use of salines, or, less advantageously, calomel or castor-oil, in the manner already described.

Ol. terebinthinæ, sulphur, cinnamon, simaruba, monsonia ovata, &c., are also of service. Ergot, adrenalin chloride, morphia and intestinal antiseptics may also be used as already described, if indications for their use arise.

Enemata also should be administered as above described. The solutions used in bacillary cases are permissible, but should be replaced, in part at least, by others. Eucalyptus gum in solutions of from ·10 per cent. to ·40 per cent. strength, injected three or four times daily, is quite the most valuable drug for use *per rectum* in acute amœbic dysentery. This agent is not only an astringent, but has noteworthy antiseptic and amœbicidal properties; furthermore, its solution has an acid reaction, which is prejudicial to the life of the amœbæ. Under its use all protozoa in the large intestine rapidly disappear, and the ulcers caused by them heal without delay. Such cases do not become chronic. Eucalyptus gum is far superior to quinine in value, but if it is not obtainable this latter drug should be used in solutions of 1 per cent. strength, twice or three times daily.

The quinine solutions commonly employed are entirely too weak to be efficient. Should the disease tend to become chronic under the use of quinine, and large quantities of mucus appear in the stools, the following formula will prove of service:—

℞.	Quinia sulph.	15
	Ac. tannic	30
	Sodii chlorid.	6·5
	Aqua. steril. .. .. ad.	1,500

M. Inject t. i. d.

As an excipient for either eucalyptus gum or quinine may be employed water, milk, or a mixture of milk and olive-oil, prepared as described above.

Acute Mixed Infections.

Cases of this variety also call for the general treatment and diet already discussed. Of medicaments, an appropriate antitoxin should be employed, and the salines, calomel, or castor-oil given in the manner above described. If it has been found by experience that the local type of bacillary dysentery does not respond so well to eliminative treatment as it does to ipecac. this drug may be employed, as in cases of simple bacillary infection. Morphia, adrenalin, sulphur, turpentine, the intestinal antiseptics, &c., have the same field of usefulness, as in the other varieties of acute dysentery.

Treatment *per rectum* is, as before noted, highly important. The best results are secured by the employment of eucalyptus gum in solution of milk and olive-oil. The following formula gives excellent results:—

℞.	Eucalypti gummi	3
	Ol. olivæ	75
	Lacti steril.	1,500

M. Inject t. i. d.

Solutions of the gum in this combination is greatly facilitated by heating. At this point it may be stated that olive-oil gives better results in bacillary cases and in mixed infections than in those of purely amœbic origin, and in acute rather than in chronic infections. A solution of the gum (3 gm.) in sterile water (1,500 cc.) is also highly efficacious, and may be employed if for any reason the use of oil is undesirable.

General Treatment of Chronic Cases.

The best preventive treatment of chronic dysentery is the exercise of great care throughout convalescence from the acute form. A few cases, especially those of the amœbic type, are chronic from the onset, but these are rare, much more so, indeed, than is commonly believed. The patient should always remain under his physician's observation for several months after all symptoms have subsided. If, however, the chronic form of the disease develops, the patient should be put under the most favourable hygienic *régimen* possible, and all mental and physical fatigue avoided.

Especial precautions must be taken to avoid chills. An abominal binder should be worn. A change of climate, especially to one that is cool, equable and dry, a sea voyage, or a course of thermal baths, frequently cause prompt improvement. But if the case be severe the patient should remain in bed. In milder cases, however — those generally seen — a limited amount of exercise is advisable, the patient taking to his bed if an exacerbation occur.

A more liberal dietary is usually allowed in chronic than in acute cases. If, however, the case be severe, it should be entirely liquid, expanding gradually, as in acute cases, as improvement progresses. Exacerbations must be met with corresponding restrictions. Fats should be eliminated from the diet as far as possible, and only those foods leaving the smallest residue allowed.

Most cases, especially those of long standing, require general tonic treatment. For this, cupri arsenitis, gr. $\frac{1}{100}$ t. i. d., is the most valuable single remedy, since these patients are as a rule emaciated, anæmic, neurotic, and if in the Tropics, not infrequently cachetic from malarial toxemia, all of which conditions this drug meets admirably. It also exercises a tonic influence in the alimentary tract, controlling the tendency to colliquative diarrhœa, which these cases sometimes develop. If indigestion occurs, dietary precautions must be supplemented by the use of digestive ferments (pepsin, pancreatin, &c.). In obstinate cases of intestinal fermentation and colliquative diarrhœa the following formula is of value:—

℞. Ac. Carbolic } Camphor } .. .. āā 10
M. ft. liquid.
Sig. Two drops in capsule, or on sugar or bread-crumbs, every two hours.

Other drugs that are serviceable in all varieties of chronic dysentery are silver nitrate (1 to 3 cgm. t. i. d.), sulphur 1 gm. to 4 gm. t. i. d., simaruba and monsonia ovata (both given as above mentioned).

Medicated rectal injections should be given as described above. Two daily will usually suffice, and often one will give better results than two, since their frequent employment for any length of time tends to weaken a patient. Each medicated enema should be preceded (about half an hour) by the injection of a copious cleansing enema of normal salt solution or a 4 per cent. solution of sodium bicarbonate.

Chronic Bacillary Dysentery.

In this variety antitoxin is of some value, but it quite fails to give such satisfactory results as are obtainable in acute cases. A much larger quantity must be employed and its use continued at intervals for some weeks.

Treatment *per oram* is limited to the use of those remedies whose general value in chronic dysentery is mentioned above. The most valuable drugs for use in enemata are ol. gualtheria, silver nitrate, alum, lead acetate, cupric sulphate, hydrozone and hydrogen peroxide. The first mentioned is far the most valuable for routine employment. It should be given in solutions of from ·05 per cent. to ·20 per cent. Silver nitrate stands next in efficiency. It, and the other mineral salts, should be used in solutions of from 2 per cent. to 4 per cent. strength. The strength of the hydrozone solution should be from 1 per cent. to 8 per cent., and that of the hydrogen peroxide solution, 5 per cent. to 25 per cent.

Protargol, a soluble silver salt from whose use much benefit might have been anticipated, caused arrythemia cordis, even when used in high dilution, and its use had to be discontinued.

I have had no experience with the other salts of this class, argyrol, collargol, &c.

Chronic Amœbic Dysentery.

In cases of this class also, the general management and treatment *per oram* are those described above for all types of chronic cases.

For use in enemata in cases of this class no drug rivals eucalyptol. It is not only intensely toxic to bacteria and protozoa, but it is a stimulant to chronic ulcers, and controls any attendant catarrhal process going on in the large intestines. The scant amount of it which is absorbed exercises a general tonic influence on the small intestines and promotes digestion. It should be given in solutions of from ·05 per cent. to ·20 per cent. strength. The accompanying table illustrates results that followed its use. As an excipient, either sterile water or normal salt solution may be employed. Glycerine may be added to facilitate diffusion, but it is not necessary. Upon the appearance of an exacerbation the use of eucalyptol must be stopped and eucalyptus gum given in its stead.

In selected cases, prone to exacerbations, but in which these are not existent at a given time, both these drugs may be then used with advantage, as in the following formula:—

℞. Eucalyptol .. .. .. 1·50
Eucalypti gummi .. .. 2·50
Aq. ad. 1,500
M. sig. Use as injection *per rectum* daily.

If eucalyptol is not at hand, ol. eucalypti may be used in its stead, in solutions of the same strength, but results then obtained are less satisfactory. If neither of these is available quinine solution (1 per cent.) should be given. It is often advantageous to combine the quinine with silver nitrate, or, if much mucus be passed, with tannic acid.

Chronic ulcers that are exceptionally indolent should, if possible, be exposed by a rectal speculum, and after the application of cocaine the undermined edges should be slit up, the ulcers curetted and touched with a strong (20 per cent.) solution of silver nitrate or pure carbolic acid. To control the action of either drug, common salt or sodium bicarbonate should be applied a few minutes later.

Chronic Mixed Infections.

There are no special measures of value in the general management of cases of this class, or in their treatment *per oram*, but the measures and remedies already mentioned as of use in all chronic cases may be employed. Antitoxin may be employed with some advantage, but for obvious reasons its results are even less satisfactory than in uncomplicated chronic bacillary infections.

As a rule, treatment *per rectum* should be directed especially against the amœbæ, but both infecting organisms can be attacked simultaneously by the use of eucalyptol and ol. gualtheria in the same solution. If both oils are employed the percentage amount of each should be half that usually given when either is employed alone. If exacerbations occur the use of the oils must be stopped and treatment employed, approximately that suitable for acute mixed infections. Eucalyptus gum is, in such an event, quite the most valuable drug for use *per rectum*.

The surgical treatment of ulcers that can be reached *per anum* is the same as in chronic amœbic cases.

It has recently been suggested that in exceptionally chronic cases of all types an incision be made in the right iliac region and colostomy performed, or the appendix vermiformis sutured to the abdominal wall and its tip removed, the remainder of the appendix thus forming a tube communicating with the lumen of the bowel. Through the opening made the colon may be thoroughly irrigated with little inconvenience to the patient. The excision of chronic ulcers, and enterorrhaphy, after perforation of ulcers, either acute or chronic, has also been advised, and in a few cases successfully performed.

The foregoing conclusions in regard to the treatment of dysentery are those reached after four years' service in the Army General Hospitals in the United States and in the Philippines, and the study therein of several thousand cases of this disease. Their applicability to cases originating elsewhere is, of course, questionable. The fact that ipecac. certainly does not yield such results in the United States or its tropical possessions as it has given in India, and that Shiga's antitoxin has not given in the Philippines the results obtained from it in Japan, demonstrates that a line of treatment valuable in one locality is not necessarily so in another, and that any statements concerning methods of treatment that have proved of service should be given general application with the greatest conservatism.

In summarising, it may be stated that the purposes of this article are to call attention to the frequency of mixed infections, especially those that follow a chronic course; to emphasise the value of treatment by an appropriate antitoxin in bacillary infection, and to introduce ol. gualtheria, eucalyptol, and eucalyptus gum for the treatment of chronic bacillary cases, chronic amœbic cases, and acute amœbic cases, respectively.

Subsidiary facts most deserving attention are that the value of olive-oil is due to its local sedative action, that this is most pronounced in acute bacillary cases, and that quinine solutions, when used as a topical application, should be of much greater strength than those commonly recommended.

TRYPANOSOMA DEVELOPED IN CULTURES OF LEISHMAN-DONOVAN "BODIES."

Captain Leonard Rogers, I.M.S., in a telegram dated Calcutta, June 29th, 1904, and published in the *British Medical Journal* of July 2nd, 1904, announces "Trypanosoma developed in Cultures of Leishman 'Bodies.'—Rogers."

Major Leishman, in the same Journal, commenting upon Capt. Rogers' announcement, states that in obtaining cultures of the "bodies" a very important advance in the investigation of the nature of these bodies has been made. In the recent article by Schaudinn (which is being translated and printed in the Journal of Tropical Medicine) some facts pointing to the possible trypanosomal origin of these "bodies" are indicated, and, as Leishman remarks, the "resting forms" of *Trypanosoma noctuæ*, described by Schaudinn, are probably in accordance with the theory that the "bodies" met with in the liver, spleen and in the neighbourhood of intestinal ulcers of human beings, are "resting forms" also of trypanosomes. Bentley's observations upon the relationship between the presence of kala-azar (mentioned by Major Leishman) amongst natives of Assam and the trypanosomes in a species of mud fish in the adjacent ponds, seem to point in the same direction. Bentley further noticed that where the fish were not so affected no kala-azar disease was met with.

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THE

Journal of Tropical Medicine

July 15, 1904.

THE CO-RELATION OF SEVERAL DISEASES OCCURRING AMONG ANIMALS IN SOUTH AFRICA.

According to the Report of the Director of the Colonial Bacteriological Institute, issued by the Government of the Cape of Good Hope for the year 1902, there are in South Africa several diseases occurring among domesticated animals which are endemic and peculiar to the locality. Of these, Horse-sickness amongst horses and mules, Heart-water in high-bred sheep and goats, and Veld-sickness in cattle, are mentioned.

The farmers in South Africa have many names for what are in reality cases of veld-sickness. Of these the more important are Imapunga, Veld-ziekte, Black lung-sickness, Rivier-ziekte, Bosch-ziekte and Gall-sickness. As long ago as 1877 the late Mr. T. Webb came to the conclusion that bosch-ziekte, gall-ziekte and sweet veld-sickness were one and the same disease, and this statement is confirmed by recent investiga-

tions. Heart-water is a disease noted for the occurrence of a serous effusion into the pericardium, but otherwise closely analogous with horse-sickness.

We know that the germ of Red-water or Texas fever may remain latent in the blood of cattle for long periods of time after their recovery from an attack of the malady, and that cattle born on Red-water veld, although they may not have been affected by this malady, yet can and do carry infection in a latent form in their blood.

Investigations showed that something of the same nature occurred in heart-water disease.

A series of experiments proved: (1) That the contagium of heart-water may be communicated to a susceptible animal in a non-virulent form and passed in succession through several others, eventually being raised to full virulence in the passage; (2) that goats through which the virus had been transmitted while in a non-virulent form were in no degree protected thereby against subsequent inoculation with virulent virus; (3) animals inoculated with a weakened virus are actually predisposed to subsequent infection with virulent blood.

A further series of experiments more or less confirmed: (*a*) The possibility of transmission of Heart-water from goats to cattle; (*b*) the corelation of Veld-sickness and Heart-water; (*c*) that goats born and reared on a farm infected with veld-sickness are not so susceptible to that disease as are goats which have been reared on a clean veld; (*d*) that goats reared on a farm infected with veld-sickness are relatively insusceptible but not immune; (*e*) that goats reared and running on a farm infected with veld-sickness are relatively insusceptible to heart-water; (*f*) and the transmission of horse-sickness from horses and goats.

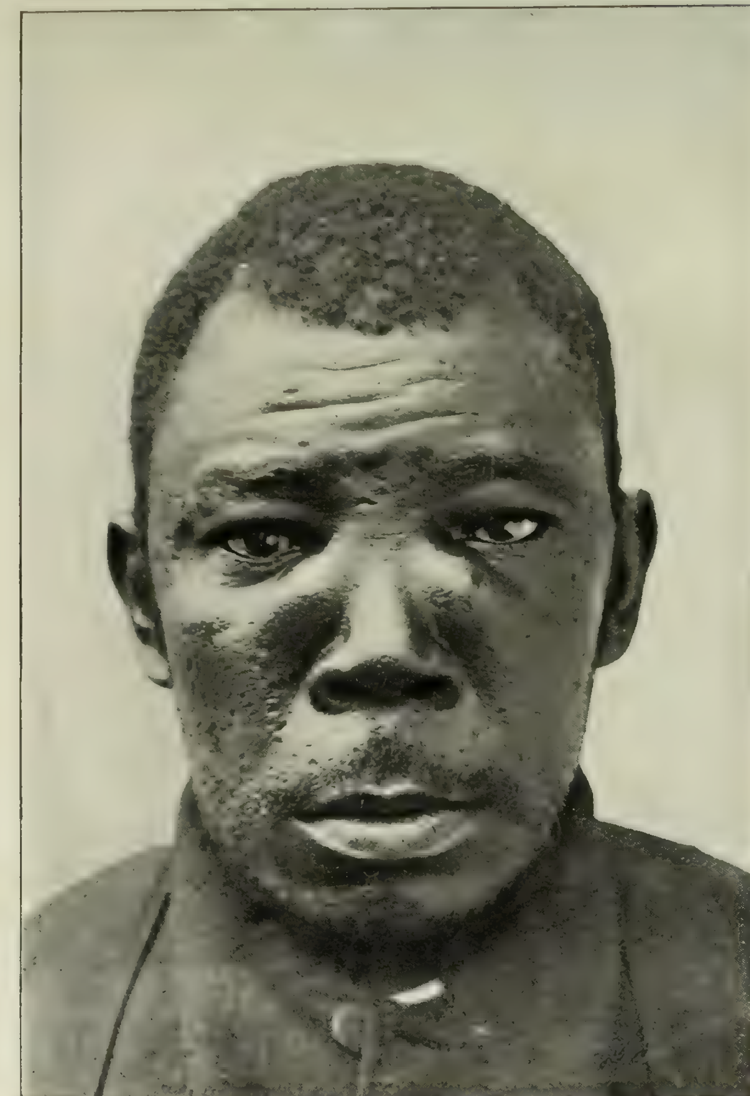
The conclusion arrived at is that the contagium which causes horse-sickness on the equids of South Africa is responsible, under conditions of relative virulence, for the infection of other species of the domesticated animals. It is remarked in the report that the means by which the virulence becomes relatively altered is not entirely clear, but Heart-water has been induced in goats and calves at Cape Town by means of the progeny of Bont-ticks taken from infected goats; that Heart-water is, however, not capable of transmission by means other than the Bont-tick, has not been conclusively proved.

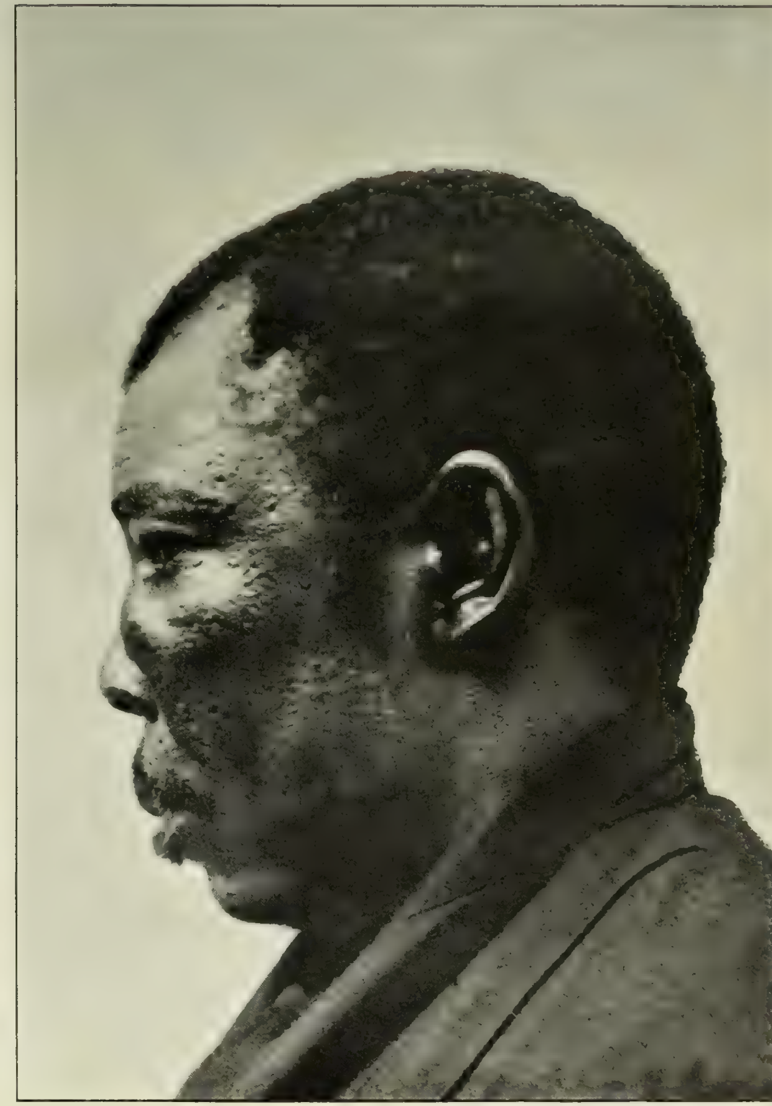
THE STRANGERS' HOME FOR ASIATICS.

In the West India Dock Road, Limehouse, London, E., an unpretentious institution carries out a useful and beneficial mission in connection with Asiatic sailors who are visiting these shores. The object of the Home, as announced by the late Prince Consort, when he laid the foundation stone of the building in 1856, is "to provide, at a moderate charge, a temporary home, or lodging and board, under adequate superintendence, for natives of any part of the Continent or Islands of Asia, of New Zealand, or any of the Islands of the China Sea, or Indian, or North or South Pacific Oceans, or of any part of the Continent or Islands of Africa, including Madagascar." Although the Home is run upon self-supporting principles, a deficit is not unknown, owing to the number of destitute natives for whom the authorities of the Home have to provide. During 1903, 725 persons found temporary residence in the Home, of which number no fewer than 118 were destitute. Owing to the number of destitutes, due to the recent quiet state of the mercantile marine trade, the annual account for 1903 shows a deficit of £380. That an institution of the kind should be hampered in its work for a few hundred pounds can only be stamped as a national disgrace. Most shipping companies and owners of ships who employ these natives, and, after taking them away from their native shores, leave them to an alien institution to be supported by the British public when financial difficulties arise, should be dealt with in a manner in which no option is allowed them. The superintendent of the Home for Asiatics is Mr. J. A. Morris, whose knowledge of the Asiatic, gained during a long experience in Eastern Seas, renders him exceptionally qualified to understand and to deal with the natives of Asia in their trials and difficulties.

TEA.

It is not our intention to enter into the qualities of tea as it is supplied to the markets throughout the Empire, nor to discuss the supremacy of China over Indian tea, or *vice versâ*. What concerns the consumer most is the method by which tea is prepared for consumption, or, in other words, how long tea should be "drawn." Our attention has been acutely focused upon this subject by a sample of tea sent us with which, amongst other "instructions for making tea," it is directed that "the water should be allowed to remain on the leaves *seven minutes*." Whilst thanking the merchants for the sample, we took the opportunity of pointing out that there surely had been a printer's error, and that "minutes" had been mis-





CASE OF GOUNDOU.

By Dr. W. Renner, Sierra Leone.

A photograph of this man appeared in the "Journal of Tropical Medicine," January, 1900. The change in the aspect of the patient after an interval of over four years may be gathered by comparing the photographs. Dr. W. Renner supplied both photographs.

Bale & Danielsson, Ltd., London.

printed for "seconds." It is useless for medical men to condemn tea-drinking, for British folk, in whatever part of the world they may be, adhere to the custom. Were care taken in the preparation of tea for the table there would be no need to condemn tea-drinking, and a wholesome and beneficial beverage would be preserved for public use.

Where are we to look for guidance as to the way tea is to be "brewed" or "infused" or "drawn," or whatever name be chosen to bestow on the process. Are the professional tea-tasters to be taken as the judges of what constitutes the best form in which to drink tea? The opinion of these experts as to the quality of tea cannot be taken as a physiological guide, for a tea "taster" merely tastes and does not swallow the prepared tea. Upon his digestion, directly at any rate, tea has no influence, for it never reaches the stomach. As time goes on, it can be easily imagined that a stronger and yet stronger flavour and bite must be present in the tea being tasted, before the jaded nerves of the palate can become stimulated sufficiently to perceive the delicacy of lightly infused tea. What is pleasant to his palate may not be, and is not, suitable for the stomach and its digestive fluids. His dicta have merely to do with the flavour of the tea he tastes, not with the physiological possibilities of the fluid he pronounces judgment upon. His opinion is of no hygienic value.

To whom, then, are we to appeal for an opinion upon tea? To the merchant? He knows still less except from personal experience, a knowledge which is every one's property, of the physiological properties of the commodity he sells. If not to the tea-tasters nor the merchant, can the analytical chemist help us? He is possibly a safer guide, but no chemist has dealt with the subject seriously, that is, in a scientific spirit. The physiological chemist is the man we would expect to direct us aright, but the matter, so far as we know, has never been considered except in a popular, and therefore a useless fashion by him.

It comes about, therefore, that, apart from each one being a law unto himself or herself, the medical practitioner is the ultimate authority, if authority there be. It is the custom for medical practitioners to condemn tea-drinking; they regard tea, as usually prepared, as a deleterious beverage, and class it along with alcohol and tobacco. Their justification for this conclusion is no doubt correct, as medical men are aware that what they mean by a cup of freshly-made weak tea is not understood, nor does it seem to be understandable, by the public. Seven-minute "drawn" tea is physiologically wrong; a seven-second drawn tea may be physiologically correct. The teapot is the great enemy to the wholesome preparation of tea in Britain. The teapot brought to the table in China and Japan is not usually the same vessel in which the tea was "drawn," but only the vessel in which tea when poured from off the leaves is stored and brought to table. In some teapots in both China and Japan, it is true that the leaves are within the teapot brought to table, but the tea is merely in a strainer at the top of the teapot immediately beneath the lid, and the water when poured over the leaves falls to the bottom of the pot and are not kept in contact with the tea in the strainer. From the countries, therefore, from which we learnt the custom of drinking tea we acquired the habit merely, not the art of preparing it. When this art is acquired, if ever we can as a nation acquire it, which seems doubtful, there will be no need to condemn tea-drinking; tea will take its place as a wholesome beverage and not be classed with alcohol and tobacco as deleterious. A few simple rules drawn up and published broadcast by some authoritative Public Health body would be of service to the public in this direction, and let those who disobey do so at the peril of causing detriment to their health. Hygienic rules for the preparation and the consumption of tea should be advanced on the following lines: (1) Never put tea leaves in a teapot but in a strainer; (2) hold the strainer over the cup to be filled and pour boiling water upon the leaves; (3) tea is to be taken with cereal, never with animal, foods.

J. C.

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By Fritz Schaudinn (Rovigno).

(*Translated from the German by P. Falcke.*)

(*Continued from p.* 207.)

Besides being distinguished from the females and the indifferent forms by their diminutive size, the little males are distinguished by their remarkably strongly developed flagellated apparatus. Not only is the blepharoplast relatively much larger, but the flagellates themselves are much longer; the motility of these forms is therefore remarkable. I am convinced that these male cells are not capable of further development and multiplication; the microgametes perish in the intestine of the mosquito as well as in the blood of the bird, and are always replaced by the indifferent and female forms, both of these forms being capable of producing male forms. It is only at that instant when the parasites are leaving the blood of the bird and undergo the most powerful alteration in their condition of life in the change of host, that the fertilisation of the female forms takes place, and that the male forms perform the function. In my complete work I shall give a more detailed explanation of the nuclear conditions of the male cells, and show that their nucleus, as in the spermatogenesis of the metazoa, already experiences a reduction in the second fission. In the perfect male it then only possesses four chromosomes, while the blepharoplast exhibits eight up to the time of fertilisation, and only becomes reduced after the act of copulation. The formation of the microgametes in the bird takes place on the same plan as that which I have described for the formation of the male trypanosoma in the intestine of the mosquito. The microgametes that have attained maturity are in structure exactly like small trypanosomes. By means of suitable methods of staining, the nucleus can be distinguished from the blepharoplast, and one can also demonstrate an undulating membrane, &c.; in brief, the ookinets with

male characteristics in the intestine of the mosquito, from which we started, are homologous to the microgametocytes in the blood. The small male trypanosomes in the intestine of the mosquito correspond to the microgametes, which, however, can only be developed in the blood of the bird at the moment of its evacuation, whereas in the circulating blood they already perish in the body of their mother cell. I regard the cause of the incapacity of the microgametes and male trypanosoma to develop further alone—or, in other words, the necessity for their fertilisation—to lie in the early reduction in the number of the chromosomes of their principal nucleus, which, in their binucleated cells, as opposed to the locomotor centre, require the subsidiary nucleus or blepharoplast to function as assimilation centre of the cells.

I conjecture that the incompleteness of the nucleus of assimilation opposed to the normally constituted blepharoplast has some connection with the early decay of these forms. I must also mention that all forms of trypanosomes in the intestine of the mosquito as well as in the blood, have the peculiarity of showing agglomeration when they are exposed to unfavourable conditions of life; this is a phenomenon which Laveran and Mesnil first discovered in the trypanosome of the mammalia. Whereas, however, these investigators state that the flagellata agglutinate with the posterior extremity (which I can confirm), I find that in many forms there is only connection of the anterior extremities. These agglomerations, which are often found in the form of copious rosettes, serve as an example when a great propagation in the intestine of the mosquito is followed by a period of hunger. The indifferent forms as well as the males then live thus united until they die off and become disintegrated. Should more favourable conditions of life set in the rosettes may again become loose. Fig. 5

FIG. 5.—Rosette of agglomerated male trypanosomes from the intestine of the mosquito.

exhibits such a bundle of agglomerated males from the intestine of culex. I am not in a position to say anything definite as to the biological significance of this process. I have found no other kind of stage in the body of the mosquitoes besides the three groups of forms of trypanosomes described above. The migrations of the parasites through the body of the mosquito will be described further on. I may here mention, however, that all three series of forms may be found there, so that accordingly all forms are liable to reach the bird's blood.

We must now see what becomes of them in the blood of the bird after it has been infected by the bite of the mosquito. The indifferent forms mostly predominate in the body of the mosquitoes and are there found in various stages of multiplication, these being the actual individuals that are capable of propagation. Their number becomes periodically reduced by males or females being developed from their series and which then may multiply only after a long period of rest or even not at all. Even when the blood of the birds is invaded, the indifferent forms mostly represent the principal mass of parasites. All three sorts of parasites affect the erythrocytes in the blood; they grow at the expense of the hæmoglobin, the products of whose metabolism is deposited in the body of the parasites in the form of the well-known granules of pigment. Thus the pigment is the common characteristic of all the stages living in the blood. In all other essential conditions of organisation they, however, agree with the other stages living in the mosquito. I did not find any other method of reproduction in the blood. I did not, in my species, observe the multiple propagation observed by Labbé[1] in the halteridium of the lark. I will only briefly describe the condition of three series of forms in the blood.

(*To be continued.*)

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Cholera.

India.—In Madras, between April 30th and May 6th, 1 death.

Turkey in Asia.—During the present outbreak there were 165 cases and 130 deaths, to May 9th.

Plague.

PREVALENCE OF THE DISEASE.

India.—During the week ending June 11th, the number of deaths from plague in India amounted to 7,762; in the Punjab 6,491 of the deaths occurred.

Cape Colony: Port Elizabeth.—During the weeks ending June 11th and 18th, fresh cases 1 and 1, no deaths.

Transvaal.—During the weeks ending June 25th, July 2nd, and 9th, fresh cases 2, 2 and 2, no deaths.

Hong Kong.—During the weeks ending June 25th and July 2nd, fresh cases 44 and 38, deaths 40 and 38.

Mauritius.—During the week ending June 30th, and July 7th, fresh cases 2 and 1, deaths 1 and 1.

Aden.—From May 15th to 24th, 4 cases and 2 deaths.

Australia.—In Brisbane from April 16th to 30th, 4 cases, and 2 deaths.

In Sydney, from April 9th to 26th, 4 cases and 1 death.

Egypt.—From April 30th to May 7th, 44 cases and 21 deaths.

[1] Labbé, A., "Recherches zoologiquès et biologiques sur les parasites endoglobulairs du sangdes vertibrés," in *Arch. Zool. expèrim.* Series 3, vol. ii., 1894.

Formosa.—April 23rd to May 14th, 1,222 cases and 842 deaths.

Peru.—At Lima, from May 7th to 14th, 9 cases and 6 deaths.

Yellow Fever.

Costa Rica.—Lemin, May 21st to June 4th, 3 cases.

Ecuador.—Guayaquil, May 11th to 25th, no deaths.

Mexico.—May 21st to June 11th, 23 cases and 5 deaths.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Plague at Johannesburg.

Pakes, W. C. C. "Epidemic of Plague in Johannesburg." *Lancet*, May 28, 1904.—The account given by Dr. Pakes, Medical Officer of Health, Rand Plague Committee, should serve to satisfy the most critical that every possible precautionary measure had been taken in Johannesburg against infection by plague. Aware of the fact that plague was widely spread throughout Cape Colony, the sanitary authorities in Johannesburg were fully alive to the danger of the disease reaching them. A special plague officer was appointed early in 1903, segregation camps were prepared, rats were systematically examined in the Government laboratories, the railway passengers were inspected, every measure, in fact, calculated to ward off and to deal with plague, should it appear, was taken.

In April, 1903, a dead rat was found suffering from plague. Between that date and the outbreak of plague in March, 1904, there were found only thirteen rats dead of plague and one cat, although almost all domestic animals were examined for the bacillus. Amongst the coloured population of the Rand, pneumonia prevailed during 1903 and the spring of 1904; but, although the bacteriologists enquired into the causes of the outbreak with plague in their minds, no proof that the plague bacillus was the cause of the fatalities from pneumonia could be found.

Curiously enough, however, Pakes remarks that "in epidemics of pneumonia long prior to the introduction of plague into this country, natives suffering from the usual pneumococcal disease did suffer from adenitis."

Previous to the plague outbreak, "a slightly increased mortality from what was certified as pneumonia, in the coolie location," was noted. The commencement of the epidemic is thus described:—

"Nothing of an alarming nature was brought before the health authorities of Johannesburg until the evening of March 18th, 1904, when the health inspector of the municipality informed the district surgeon of Johannesburg that he had found in the coolie location a large number of sick persons collected together. The assistant district surgeon was instructed to visit the place in question, and he reported to the district surgeon that he found a number of sick Asiatics suffering from what appeared to him to be pneumonia, in a house in the coolie location. At 6.30 a.m. on March 19th, the district surgeon, the acting medical officer of health of Johannesburg, and the assistant bacteriologist for the Transvaal, visited the house in the location. They found five corpses and twelve cases of sick in a four-roomed house.

"The *post-mortem* examinations revealed nothing which could not be explained by death from pneumonia. There was not a single classical symptom of death from plague; the spleens were not enlarged and were not markedly hyperæmic; there were no ecchymoses or hæmorrhages; the organs, with the exception of the lungs, were normal. The lungs showed patchy pneumonic consolidation of the lobular type, and although a very careful search was made for enlarged glands, none were found. It is to be remarked that not even a single bronchial gland was found. Portions of the lung on bacteriological examination showed organisms morphologically identical with the plague bacillus. Owing to the insanitary condition of the coolie location and to the large and unknown number of cases in that location, it was decided to cordon the whole area in order, if possible, to keep the actually infected people within a limited area. The cordon was formed at 4 a.m. on March 20th, and on the same day at 9 a.m. an emergency meeting of members of the Johannesburg Town Council was held, when the acting medical officer of health and the district surgeon were instructed to take all necessary steps. By 9 a.m. on March 20th further deaths had taken place, making a total of twenty-six deaths in thirty-six hours. It is to be remarked here that not a single case of these showed any signs of buboes. On March 22nd, the Government published plague regulations and constituted the Rand Plague Committee, composed of ten members from Johannesburg and representatives from the various local authorities within the Witwatersrand area. This Committee was given plenary powers to deal with the outbreak within that area and to establish plague and isolation camps.

"One of the first decisions arrived at by the Plague Committee was to remove the whole of the population of the coolie location to some site outside the town, and the transfer of the population within the cordoned area to the segregation camp was completed on March 30th. This population consisted of 1,600 Asiatics, 1,358 natives, and 142 coloured people, making a total of 3,100 transferred to the segregation camp. During the incubation period of the disease only one death from plague occurred. After twelve days' interval the inhabitants of the segregation camp were allowed to come and go under certain nominal restrictions. On April 8th the coolie location was burned to the ground. In order to prevent the escape of rats, cats, dogs, fowls, and other creatures, a galvanised iron fence was put up round this location, and the various animals and birds which had not been previously caught and destroyed were then caught, killed, and burnt in the fire."

Trypanosomiasis.

Ehrlich, P., and Shiga, K. "*Farben-therapeutische Versache bei Trypanosomenerkrankungen* (Treatment of Trypanosoma Affections with Stains)." *Berliner*

Klinische Wochenschrift, 1904, vol. xli., No. 12.—Ehrlich and Shiga have experimented with several stains in an attempt to find a substance which should prove inimical to the trypanosoma parasite. They found that "trypan red" destroys the trypanosomata in mice, and prevents relapses of trypanosomiasis. The colouring matter can be given by the mouth or subcutaneously. The trypan red is a combination of one molecule of tetrazotised benzidin-monosulpo and two molecules of sodium naphthylamindi-sulphonate. The skin is reddened by the injection of 0·5 cc. of a 1 per cent. solution injected hypodermically.

Report of the Portuguese Commission on Sleeping Sickness in West Africa.—La Maladie du Sommeil: Rapport par la Mission envoyée en Afrique Occidentale Portugaise. By A. Bettencourt, A. Kopki, C. Mendes, and G. de Rezende. Lisbon: Libanco da Silva, 1903, pp. 280, illustrated.—Except from the point of view of the geographical distribution of sleeping sickness, the report of the Portuguese Commission has but little to arrest attention. The report is admirably drawn up, the facts in connection with the history of the disease are fully enumerated, and the amount of work accomplished in both extent and quality is most creditable. Lounda, the district lying to the north of Portuguese West Africa, and bordering on the Congo River, was found the most seriously affected area. The disease was not equally distributed. In low-lying, moist and hot districts, where vegetation was plentiful, the disease was most common. Where vegetation was, on the other hand, scanty, as at Ambaca, sleeping sickness was rarely met with, and again at Pungo-Ndongo, situated at a considerable height, and with a dry, bare, and rocky soil, the disease was hardly known. *Sex*: both sexes seem to suffer indiscriminately from sleeping sickness. *Age*: persons of all ages are attacked. *Race*: Negroes suffer most, half-castes less. *Food*: dried fish, meat when obtainable, maize and manive. The water is usually polluted. Alcohol and tobaccos are largely indulged in. *Heredity*: the hereditary nature of sleeping sickness is denied. *Contagion* is believed in, and the clothing and saliva are considered by the natives to be the media of infection. The authors consider that the primary lesions of sleeping sickness take place in the lymphatic system, and the nervous system becomes infected subsequently.

Micro-organism.—The diplo-streptococcus discovered by the Portuguese Commissioners is identical with that described by Castellani in Uganda. *Treatment*: during the attack of fever sodium salicylate is recommended. Many other drugs were tried, quinine, arsenic, kola, &c., but without any perceptible benefit. A 1 per cent. solution of lysol was injected into the subarachnoid space by lumbar puncture, but without effect. A serum derived from asses after inoculation with the diplo-streptococcus isolated by the Commissioners also proved unavailing. *Conclusions*: sleeping sickness is a diffuse meningo-encephalo-myelitis of an infectious nature, due to a specific diplo-streptococcus. *Prophylaxis*: isolation of persons afflicted with the disease; disinfection of homes, clothes, &c; separate eating and drinking utensils for each person in the infected areas, in addition to general hygienic measures. The discovery of the trypanosoma in the cerebro-spinal fluid of persons suffering from sleeping sickness by Castellani, and the part played by the tsetse-fly in the transmission of the disease by Bruce, have rendered the pathological aspects of this report more or less of academic interest merely.

Linton, S. F., and Thomas, H. W. "A Comparison of the Animal Reactions of the Trypanosomes of Uganda and Congo Free State Sleeping Sickness with those of *Trypanosoma gambiense* (Dutton)." *Lancet*, May 14th, 1904.—The conclusions come to by these observers are:—

(1) The trypanosomes found in (*a*) cerebro-spinal fluid of Uganda sleeping sickness cases, (*b*) cerebro-spinal fluid of Congo Free State sleeping sickness cases, (*c*) blood of Uganda trypanosome fever cases, and (*d*) blood of Congo Free State trypanosome fever cases, are all identical in animal reactions and morphology with *Trypanosoma gambiense*. The specific name *gambiense* (Dutton) must therefore for the future include the trypanosomes from the above-mentioned sources.

(2) There seems to be no acquired immunity against infection.

(3) There is no transmission of immunity to off-spring.

(4) An animal which seems to have recovered may months later show parasites once more, apparently as the result of lowered vitality.

EXCHANGES.

Annali di Medicina Navale. Annali d' Igiene Sperimentale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Medical Gazette. Indian Medical Record. Interstate Medical Journal. Janus. Journal of the Royal Army Medical Corps. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Transactions of the American Microscopical Society. Treatment.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Publishers.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

THE TREATMENT OF DYSENTERY.

By J. G. Berne.
Captain, Royal Army Medical Corps.

There is no doubt that dysentery is an infectious disease due to a parasite, but whether dysentery is really a separate entity is doubtful. The treatment of this disease will be discussed under the following heads :—

(1) From a bacteriological standpoint.
(2) The drug treatment.
(3) Prophylaxis.

(1) From a Bacteriological Standpoint.

Modern teaching has shown that dysentery is a complex clinical conception, including besides imperfectly worked-out "sporadic" dysentery and the dysentery of asylums—two well characterised ætiological entities, viz., (*a*) amœbic dysentery and (*b*) bacillary dysentery. Shiga has demonstrated that the serum of human beings suffering from dysentery agglutinates *B. dysenteriæ* either in masses or in filaments—dilutions up to 1-200. Vedder and Duval found that bacilli of American dysentery were agglutinated by serum, also cultures of Shiga, Krause, and Strong.

According to Shiga (1901) the agglutination appears in the second and third weeks of the disease, reaching its highest point in the convalescence. At the same time Marten and Lentz have recently shown that the agglutin test should be used only with potent artificial serum, and not with the sera of patients. In this way they have shown that the bacillus (Flexner, Strong) is not the genuine dysentery bacillus of Shiga.

Of especial importance are the dysenteric-like bacillus, causing the pseudo-dysentery of the insane. In such cases Krause found rods which morphologically and culturally could not be distinguished from B. Shiga, but he found they were not agglutinated by serum of genuine dysenterics, but they were agglutinated by serum of pseudo-dysenterics. Lentz, who examined one of these pseudo-dysenteric bacteria, found that in litmus mannite agar it formed acid and turned the medium red, whereas the true dysenteric bacillus did not.

Pathogenic effects have been several times noted from ingestion of cultures. In Flexner's case it was accidental. In the case of Strong it was intentional. Shiga also in 1898 inoculated himself with one-twelfth of an agar culture, killed at 60° C.; severe local symptoms ending in nine days in abscess formation. Ten days after the inoculation agglutinating properties were present (one-tenth dilution). The bacillus was found pathogenic for mice, guinea pigs, rabbits, cats and dogs. When the cultures were introduced into the digestive system diarrhœa was produced with mucus, and even bloody stools in some cases. After subcutaneous injections guinea pigs and rabbits usually die in a few days with great loss of weight after the injection of small doses. Even with dead cultures powerful toxic effects are seen, one-half to two-thirds loopful will kill a 3,000 grm. guinea-pig in one to three days. Immunisation against dysentery has been performed by Shiga; he immunised horses against *B. dysenteriæ*, and obtained a powerful anti-dysenteric serum. Shiga found this serum markedly bactericidal. On heating, or on keeping the serum, it was inactivated, but Shiga found that normal horse serum was able to reactivate it, and also normal human serum. It is interesting to note that this is the first bactericidal serum which has been found to be activated by man. From 1897 to 1901 Shiga has treated 510 individuals suffering from dysentery.

Patients in the early stages of the disease were rapidly cured, or their condition markedly ameliorated.

In advanced inflammatory stages the administration of the anti-dysenteric serum reduces the number of stools, and within two or three days cure is effected. On the other hand Lentz has reported recently that the serum of a highly-immune goat possesses no bactericidal power at all.

Shiga has pointed out that the prognosis depends on the site of the dysentery. Thus :—

Localisation of Dysentery	Therapeutic Treatment			Serum Treatment		
	Cases	Death	%	Cases	Death	%
Sigmoid and rectum ..	62	6	9·7	80	2	2·5
Colon, descending ..	94	49	52·1	90	8	8·8
,, transverse ..	4	4	100·0	5	0	0·0
,, whole	17	15	88·2	8	6	75·0
Large and small ..	1	1	100·0	10	4	40·0

Shiga has pointed out the ætiological significance of the *bacillus dysenteriae.*

(1) That it occurs in all cases of dysentery.

(2) The bacillus occurs only in dysenteric patients, not in healthy people or in people suffering from other diseases.

(3) The occurrence of the bacillus corresponds with the disease.

(4) That the bacillus is found abundantly in the deeper layers of the intestine.

(5) The bacillus, or its toxine, produces hæmorrhagic effects.

(6) Bacillus is agglutinated only by the blood of dysenteric patients.

(7) Bacillus dysenterica killed by heat produces inflammatory lesions in healthy people.

(8) Pfeiffer's reaction is well developed by convalescent dysenteric serum.

(9) Immune serum has markedly prophylactic and curative properties.

From the above review of the bacteriological facts known regarding the treatment of dysentery there is doubtless much hope in the future in this the most scientific form of treatment.

(2) Drug Treatment.

Of primary importance in the treatment of dysentery in all forms is rest and diet. The patient is to be confined to bed throughout an attack, whether mild or severe. Every movement in bed is to be avoided as much as possible. The bed pan should be used to obviate the necessity of the patient getting up to stool.

Fresh milk given lukewarm is perhaps the best

diet in most cases. When fresh milk cannot be obtained condensed milk may be substituted. When ordinary milk is not well digested peptonised milk or milk diluted with lime water may be found to answer. In a considerable number of cases milk in any form disagrees. Manson remarks that when the tongue is coated milk is not well borne. This is true, but it also occasionally disagrees when the tongue is clean. In these cases good beef tea or chicken soup or barley water may be substituted. Whatever may be the food selected it should be given in small quantities in the intervals between the doses of ipecacuanha if this remedy is used. As a rule alcohol is not only unnecessary but hurtful, but in some cases the free use of wine and water has done good. The causal indication which is to destroy the pathogenic agents of the disease can only be carried out in an empirical manner.

Salol has been recommended by Rasch, Fisch and Kartulis. It may be given in 15 to 20 gr. doses in cachets, and may be used along with castor oil.

Naphthalin has been given by the mouth and enema with some success by Rossbach and Novikoff. It may be given in 15-gr. doses four times a day by the mouth or in enema dissolved in some mucilaginous menstruum.

Benzo-naphthol appears to be deserving of further trial. It has little toxic power. It passes through the stomach unchanged, breaking up in the intestine into beta-naphthol and benzoic acid. It is specially indicated when the kidney is diseased; 30 to 50 grs. may be given daily in divided doses. In the present state of our knowledge these remedies are to be looked on rather as auxiliaries to other methods of cure than as means of cure to be trusted to alone. The indications from the disease are to prevent the healing process being disturbed by the passage of excrementitious matter over the inflamed surface, and to secure rest for the bowel by the use of sedatives, such as Dover's powders.

The importance of a non-irritating diet.—Experience has proved that there is danger in attempting to arrest the peristaltic movement of the bowel by opiates. Many cases may recover under such treatment because many cases will recover without any treatment other than rest and dietary, or in spite of inappropriate treatment. The symptomatic indications are to relieve pain and local irritation. Small opiate enemata are sometimes useful when tenesmus and dysuria are distressing. Poultices, fomentations and turpentine stupes often afford considerable relief.

Poultices, if they are to be of service, should cover the whole abdomen and be removed before they begin to feel cold to the patient. A warm bath given at the commencement of the disease is useful if care be taken to prevent a chill. The most successful treatment of dysentery is purely empirical, and consists in the use of ipecacuanha, salines and mercurials.

Ipecacuanha and salines are alternative remedies adapted to the same form of the disease. In severe cases, if there is no contraindication to its use, ipecacuanha should be employed. Salines are to be preferred in the case of young children, delicate persons and pregnant women, and when ipecacuanha cannot be tolerated. Mercury is to be resorted to in those cases only in which other remedies have failed, and in epidemics in which they have been found inefficacious, as it is impossible to distinguish from the symptoms the class of cases likely to be benefited by one or other of these remedies, the ipecacuanha or saline treatment should be employed in the first instance and receive a fair trial.

Use of Ipecacuanha.—There are several methods of using this drug. Lodré, of Rio Janerio, uses the Brazilian method,

℞. Ipecacuanha .. .. .. ʒ i.
Barley water .. .. .. ℥ vi.

allowing it to steep for twelve hours; at the end of that time pour off the liquid to be given to the patient and keep the powder; again pour six ounces of boiling water on it and leave it to steep for twelve hours, after which pour off the liquid as before, to be administered to the patient; from the same powder make a third infusion in the same manner. The liquid resulting from each infusion and maceration is administered in the course of a day, either all at once or in broken doses. Lodré says that on the first day the patient is sure to have nausea and repeated vomiting; on the second day there is usually nausea, he says, without vomiting; and on the third day the tolerance is nearly complete. Some physicians give a fourth infusion made with the same powder as the former ones, but it is so weak as to appear totally inert, and it is better to recommence the treatment on the fourth day with a little smaller dose (2-3 grs.) of ipecacuanha, which will serve for three successive macerations of twelve hours each. Lodré considers the vomiting provoked by ipecacuanha prejudicial to the patient as it tends to debilitate him, to give him a repugnance for the medicine, and to suppress his appetite. The Brazilian method is open to the objection that it always provokes vomiting and nausea, and many patients refuse to continue the treatment. Lodré adds to the above mixture some cinnamon and a small quantity of morphine, and gives the mixture in broken doses. On the first day fifteen minutes before each dose he gives the following:—

℞. Menthol .. .. gr. ii.
Jamaica rum .. .. .. ʒ v.
Tinct. opii .. .. .. gr. iss.

and orders a mustard leaf to the pit of the stomach.

Sir Patrick Manson gives 15-30 minims of tr. opii before the administration of the ipecacuanha; just as the patient is coming under the influence of the opium, the ipecacuanha is given. This was tried with marked success, I am told, in No. 9 general hospital in Bloemfontein. Some physicians use calomel and opium. Lodré also recommends

℞. Pulv. ipecacuanha .. .. gr. iss.
,, opii .. .. .. gr. $\frac{1}{3}$
Calomel .. .. gr. $\frac{3}{4}$.

In a capsule to be taken every two hours.

In mild cases 3 grs. of Dover's powders alone, or in association with bismuth or salol, may be given with advantage every two hours, four or five doses during the day.

Davidson does not think vomiting of serious consequence unless excessively protracted.

By emptying the bile ducts, by causing free perspi-

ration and by the general succussion of the system to which it gives rise, the emetic action of the ipecacuanha is salutary in dysentery. Davidson recommends twenty drops of laudanum be given before the next dose. The remedy, he says, should be continued at longer intervals until the blood and mucus has disappeared from the stools. If diarrhœa continues it may be treated with Dover's powders or bismuth. De-emetinised ipecacuanha has been recommended in the treatment of dysentery, but its value as a substitute for the ordinary powder is doubtful. This treatment, first recommended by Harris, has been employed of late years. The conflicting reports of the therapeutic value of this drug are due to its varying composition. Some of these preparations which contain little extractive matter are useless, others, retaining the greater part of these extractives and some emetine, have been given with success. De-emetinised ipecacuanha has been tried in the chronic forms of dysentery, which come so frequently to Netley, but the experience here recorded is that in such cases its properties are inferior to the ordinary ipecacuanha. When there is much dysuria a hypodermic injection of morphia may be given. Fayrer states that since the introduction of ipecacuanha the mortality of the British Army, which was 11 per cent. before its use, fell to 5 per cent. after its employment. McDowall recommends that ipecacuanha should be given at bedtime, never in the morning or during the course of the day.

Ammonium Chloride.—Drachm doses of this drug, administered every fourth hour, and the patient kept on arrowroot, has been recommended as a form of treatment. Attygalle speaks highly of this treatment, and states that in the majority of cases blood was absent from the stools on the third or fourth day. In two cases he had to resort to ext. opii and cannabis indica, dissolved in a wine-glass of bee's honey and mixed with a quarter of a fresh bael fruit. He does not recommend opium in the early stages of tropical dysentery, its beneficial effects are only seen in the last stages when combined with cannabis indica, and when other drugs have failed. Wyatt Smith, of Buenos Ayres, has treated a large number of cases of acute dysentery wiih ipecacuanha and morphia, with blisters applied to the epigastrium. Only a small number of such cases recovered. He found large doses of magnesium sulphate with dilute sulphuric acid at short intervals acted like magic. He only lost one case, a sailor, who was brought in collapsed, delirious, and passing blood in large quantity. This form of treatment was stopped and opium was given, ½ gr., and repeated every third hour. The man rapidly sank and died forty-eight hours after admission. Wyatt Smith states that in the acute tropical dysentery of Monte Video and Buenos Ayres

(1) Ipecacuanha is useless.

(2) Opium is poison.

(3) That the treatment of dysentery is essentially purgative.

(4) That magnesium sulphate is practically a specific.

Buchanan, *British Medical Journal*, February 10th, 1900, has treated 555 cases by the saline method with only six deaths. Saturated solution of magnesium sulphate was used, and when none could be obtained sodium sulphate was substituted, and he was so pleased with it that he continued it. The following was the mixture:—

℞. Sodii sulph. .. .. .. ℥ i.
Aqua fœniculi .. .. ad ℥ iv.

Of this mixture ℥ ss. was given three or four times a day. Purgatives should be free, but gentle, and when light yellow stools without a trace of blood or mucus are passed then the drug should be stopped, but resumed at once if blood or mucus reappears in the stools.

It is usually found that after five or six stools all blood and mucus has disappeared from the stools, but in many cases they reappear in a day or so; in such cases sodium sulphate must be given again. Highly yellow bilious stools are characteristic of the drug. The only other drug which produces such stools is the monsonia ovata, used by Dr. Maberly, of Cape Town. He uses a tincture of 2½ ℥ of dried plant to a pint of rectified spirit.

Buchanan has used this drug, sent to him by Dr. Maberly, and finds that it produces copious yellow stools, to the great relief of the patient. Buchanan has treated chronic and relapsing cases of dysentery with castor oil, but this plan has been tried by Buchanan without success. He treats such cases, when first admitted into hospital, with sodium sulphate, one, or at most two, doses, and then bismuth and soda.

He has come to the conclusion that salines are harmful in cases where there is ulceration of the bowel. In ordinary cases the acute stage under this form of treatment is over by the third or fourth day, and if the stools remain free from dysenteric products he gives them a tonic of iron and nux vomica. Important as the saline treatment is, dieting yet is equally so. In India, in acute cases, what is known as Mar and Dahi are given, 8 oz. of each, two or three times during the day. Mar is made as follows: 1 lb. of well-cleaned rice is thoroughly boiled with 3 pints of water and then strained. There should then result a white, starchy substance of the consistence of porridge. The two are mixed together by the patient and eaten. This is given at 10 a.m. and 5 p.m. At 7 a.m. half the quantity is also given, except when bael fruit is in season, when bael is given instead of mar. All the cases were kept on this treatment until the stools became semi-solid, when rice, milk and soup were added.

Day, *British Medical Journal*, February 4th, 1899, writing from his experience in Benin, contrasts the saline method with that of ipecacuanha.

(A).—

Month	No. of Cases	Treatment	Recovery	Died
May	15	8, Ipecacuanha and Opium	4	4
		7, Ipec. and Liquor Hydrag.	5	2
June	13	10, Ipec., Opium and Liquor Hydrag.	8	2
		1, Ditto and Mag. Sulp. later	—	1

(B).—*Magnesium Sulphate Method.*

Month	No. of Cases	Recovery	Died
July	12	12	—
August	12	11	1
September	7	7	—
October	1	1	—

Calomel.—This drug is used in Algiers, and was introduced by Annesley. Scheube speaks highly of it, and recommends that it should be given in large doses, taken rarely. Manson would give calomel in combination with ipecacuanha and opium, 1 gr. of each every six hours. Some give calomel from the outset as a routine treatment, or in 5 gr. doses every six to eight hours, the effect being watched. In gangrenous dysentery this drug is contraindicated by Manson and Davidson.

Roux in chronic dysentery has observed favourable results in cases not too advanced from a combination of ipecacuanha, calomel, and opium, in the form of Segond's pill.

℞.	Red Ipecacunha	0·4
	Calomel	0·2
	Ext. Opii.	0·05

Kartulis favours the administration of repeated small doses. He prescribes ·05 to be taken ten or twelve times during the twenty-four hours. Recently he has given napthalin in conjunction with calomel, his prescription being as follows:

℞.	Calomel	0·5
	Naphthalin	1·0
	Ol. Bergamott	9th iii.

F. dos. No. x. ad.

One capsule every hour.

Fractional doses of calomel has been found of great use in the dysentery of children. Davidson would give calomel in those cases which have been treated with ipecacuanha from the commencement, and notwithstanding passes into the serious stage. In those cases of bowel complaint with frequent slimy and bloody stools, one gr. of perchloride of mercury dissolved in ten oz. of water, and given as Ringer recommends in doses of 30 to 60 minims is very useful. Quinine should be given if there are any indications of malària. If digestive symptoms intermit the disease should be treated by quinine alone. If there is a suspicion of scurvy, the patient should be placed on milk diet. A free use of lime juice is indicated.

Lafleur in treating the amœbic form of dysentery gives calomel, salol and quinine, rest in bed even in chronic cases with little constitutional disturbance. In acute cases the patient will need little persuasion; milk is the staple food. If curds are found in the stools the milk will require to be peptonised.

Rectal injection is the most rational and direct method of treatment in this form of dysentery. Quinine and corrosive sublimate have been used with success. Lösch found that the amœbæ are destroyed by a solution of 1 in 5000 of quinine, and nitrate of silver 30 grains to the quart.

Sir Patrick Manson recommends that calomel should be used in combination with ipecacuanha and opium. He recommends 1 grain of each every six hours from the outset as a routine treatment or in 5 grain doses every six to eight hours, the case being carefully watched. In gangrenous dysentery Sir Patrick states this treatment is contraindicated.

Chronic Dysentery.—This form of dysentery has been treated by various methods.

Hillier of Kimberly has treated chronic dysentery by castor oil and opium combined at comparatively short intervals and in small doses. One drachm to 2 ounces with about 4 to 10 minims of tr. opii three times a day is his usual method. Jameson from his experiences at Kimberly recommends milk injected with a long tube in acute and chronic cases; Hillier uses the milk injected in obstinate cases of a chronic nature. He says it cleans the bowels and is more easily tolerated than any medicated and especially astringent lotion. In fact it is not only merely tolerated but has a bland and soothing action on the irritable bowel. Rest is of course essential. Hare, of Edinburgh, has recommended injections of silver nitrate, and Osler recommends 20 to 30 grains of this solution to the pint of water, three pints should be injected. This is also recommended by Sir Patrick Manson and Percy Kidd. Bismuth subnitrate and salicylin have been recommended for chronic dysentery in large doses. Ross does not recommend opium. A. Plehn administers bismuth from the fourth day. Manson and Davidson recommend oleum terebinthinæ in gangrenous dysentery where ipecacuanha has proved futile. Fayrer recommends the same drug as follows: 24 minims of oleum terebinthinæ to be given every third or fourth hour, usually with small doses of opium. Kartulis recommends it in cases of chronic dysentery where there is tympanites.

Simaruba (*Ailanthus*), *Glandulosa.*—Manson speaks highly of this drug in the subacute and chronic cases.

Kartulis says that it is useless in acute cases but is good in chronic forms.

Fisch strongly recommends iodoform enemata in chronic cases.

Rectal injections were the chief method of treating chronic cases in the late war in South Africa. Lillie's method seems to be the best as far as my limited experience went. He used a soft œsophageal catheter attached by a piece of glass tubing to some soft rubber tubing about three feet long, to this was fixed a glass funnel. The patient was placed on the left side and the hips drawn over to the edge of the bed. Two or three times during the day boric acid, 10 grs. to the pint, was given. It is important to give the injections two or three times a day. The stools were diminished in frequency and became semi-solid within three days. Relapses were uncommon. In the malignant cases, occurring generally in epidemics, the use of the injections is doubtful. Unfortunately these cases are so rapidly fatal, the destruction of tissue so great, that a successful termination is always remote.

The danger of causing perforation by giving injections only applies in those cases where the bowel is extensively and deeply ulcerated. Some cases are obviously hopeless, and their clinical appearance is a sufficient safeguard from a rash use of injections. With regard to perforation in dysentery Lillie found that out of 2,711 cases whose records he had examined, only in 5 cases did perforation occur.

With reference to amœbic dysentery it must be noted that greater caution should be observed when using perchloride of mercury and silver nitrate solutions than with the quinine solutions. From 1 to 2 pints of one of the above solutions should be used three or four times a day. The injection should be made slowly so as to cause the least possible discomfort, and the patient should be directed to retain it, if

possible, fifteen minutes, gentle friction being meanwhile practised over the course of the bowel with the object of diffusing the fluid throughout the whole of the affected area. The passage of the enema is facilitated by raising the hips.

Quincke has used calomel in two cases of chronic amœbic dysentery.

(3) Prophylaxis.

The prevention of dysentery is one of the most difficult but important problems for the Army Medical Officer and Public Health Departments.

Sanitary *régime* in time of war, especially on the line of march, presents great difficulties. It can hardly be expected that men arriving in camp after a long march will commence filtering and boiling water, or digging trenches. Again, when troops are in close contact with the enemy, and there is the prospect of an engagement impending, it is difficult for all, except the most experienced, to pay the slightest attention or put into practice the simplest laws of sanitation. Not trained in hygiene, the regimental officer's mind is directed to the main purpose for which his regiment is in the field, viz., dealing with the enemy; and it cannot be expected he will take an interest in sanitation, a subject which cannot be learnt intuitively. Sanitation then resolves itself into a few set recommendations, such as boiling water, filtering water, disposal of fæces and burying of carcases, while insisting that the soldier should conform to the routine regulations of the army.

In a regiment the commanding officer must necessarily be the supreme authority and be responsible for the health of his men, but his duties in this respect would be rendered easier if a special sanitary corps was formed, composed of specially trained officers, non-commissioned officers and men. A camp quarter-master should be appointed for executive sanitary duties connected with the regiment, in order that all orders and regulations should be promptly obeyed and carried out. He would be to the regiment what the sanitary inspector is to the civil population, and he should be as highly trained. Once appointed he should not be moved to hospital. No trench system will ever be safe, especially in warm climates and in countries with dust storms and strong winds, unless a man is always at each latrine to cover excreta immediately after the latrine has been used. No white man will do this, but natives of the sweeper class of India will do this—Chinese and low-class natives generally will perform the work without any objection. Every Indian regiment has its own proportion of jemadars, sweepers, and water carriers. In the tropics, where flies abound, the question of covering becomes one of urgent need, and in such cases sweepers can always be recruited from India. With an efficient system for the disposal of waste, it is necessary to provide an agency to secure at all times a pure water supply. This can only be by the provision of a special water section, whose sole duties would be to attend to the water carts, and to the preparation, storage, and distribution of pure water. In this connection it has to be recognised that polluted water is one of the most fertile sources of dysentery, and as such has to be guarded against.

Many cases can be given of water polluted with sewage doing no harm, due on some occasions to the season of the year, on others to the absence of any specific pollution, and on others to the insusceptibility of those who drink the water; but these facts have to be borne in mind, viz., that the army consists of young men at an age which renders them susceptible, and it is impossible to discriminate between water polluted with healthy sewage and that polluted with the dysentery germ.

Accordingly the drinking of water contaminated with sewage involves a considerable risk, which cannot be avoided in any way but by careful selection of the source of supply, guarding that supply from pollution, sterilising the water either by filtration, chemical reagents, or by heat. It is not practicable or safe for the purification to be left to the discretion or to the individual efforts of the soldier. It must be done for him.

Milk as a cause of dysentery deserves some consideration. Dr. Finny (Royal Irish Academy of Medicine, March 6th, 1896) reports a case of acute dysentery which broke out in September, 1889, among a family of seven persons. Five were attacked and two died: the deaths occurred in one old lady and an infant 11 months old. The ages of the others were 37, 49, and 12 years. The first case began on September 12th, lasted fifteen days and ended fatally. The second case occurred two days after the first and lasted fourteen days (recovery). The third began on the 19th, and after four days died. The fourth began also on the 19th and after nine days recovered; the fifth also recovered after seven days and began on the 21st.

No other inmate of the house (and there were several) was ill before, during or after the outbreak; and no cause could be suspected except that for two days before the outbreak MILK was used which had been supplied by a friend whose child was reported to have died on September 14th of intestinal disease.

The family had just returned in perfect health from spending the summer at the seaside. It is very probable that the latter contracted the disease by contagion.

The main points to be noted in the prevention of this disease will be:—

(1) The destruction of infective fæces, either by burial, disinfectants or heat.

(2) The isolation of infected individuals.

(3) The isolation of SLIGHTLY infected individuals.

(4) The control of drinking supplies.

In view of the fact that milk may be a source of the disease, milk supplies should be carefully watched during an epidemic and the milk boiled or Pasteurised.

REFERENCES.

Flexner, "The Ætiology of Tropical Dysentery."

Shiga, "Ueber der Dysenterie bacillus," *Cent. f. Bakt.*, 1898, pp. 817, 870, 913.

Müller, P. T., *Ueber den Bakteriol Befund bei Einer Dysent. Epidemic in Sudsteriarmark*, 1902, xxxi., p. 558.

Krause, "Der jetzige Stand der Dysenteriefrage," *Deutsche Ærtezeitung*, 1902, No. 2.

Colonel Bruce, R.A.M.C.

Allbutt, vol. ii.

Manson, "Tropical Diseases," 1902.

Ziemssen, "Practice of Medicine," vol. i.

Scheube, "Tropical Disease."

Davidson, "Diseases of Warm Climates."

NOTE ON THE OCCURRENCE OF THE LEISHMAN-DONOVAN PARASITE IN ARABIA AND EGYPT.

By Llewellyn Phillips, M.D., F.R.C.S., M.R.C.P.
Kasr-el-Ainy Hospital, Cairo, Egypt.

Enlargement of the spleen, with or without ascites, is a very common disease in Egypt, and for some time I have been studying the cases that occurred of ascites in Kasr-el-Ainy Hospital, the results of which will appear in the forthcoming volume of the records of the Egyptian Government School of Medicine. The main facts that I elicited were that in a hundred consecutive cases of ascites, disease of the heart accounted for 4, possibly 7, per cent., of the lungs 3 per cent., of the kidneys 8, possibly 9, per cent., of the peritoneum 3 per cent., of the liver and spleen 78 per cent., of which malignant diseases formed 5 per cent. of the whole, syphilis 1 per cent., alcohol 8 per cent., bilharzial cirrhosis 1 or 2 per cent., malaria 30 per cent., leaving 32 per cent. of doubtful ætiology. I had, however, hesitated to puncture enlarged spleens in these cases in order to search for malarial parasites; but in April of this year Dr. Balfour, of Khartoum, told me that in a case at Khartoum, on splenic puncture, Leishman's parasite had been discovered. On being assured that no ill effects usually followed puncture of the spleen, I decided to search for the parasite in cases under my care at Kasr-el-Ainy Hospital, feeling fairly certain that some of these cases of enlargement of the spleen, without any apparent cause, would turn out to be associated with the parasite in question. This I accordingly did, staining the films so obtained by Leishman's stain, or by Romanowsky's stain prepared as recommended in the report of the trypanosomiasis commission.

After some failures, I found the parasite in large quantities in the splenic pulp of a Turk who had lived for a long time in Yemen in Arabia. Three days later I admitted another patient who had also lived for a long time at Mecca in Arabia, and whose splenic tissue also yielded the body in question in very large numbers. These bodies in one of the two cases were perfectly typical, occurring often in masses of 200 to 300, and staining with the Romanowsky red and with the red of Leishman's stain. In the isolated parasites the two chromatin bodies could be made out. I showed the films to Dr. Bitter, of the Sanitary Department, Cairo, and he recognised in them the same bodies that he had been shown by Dr. Sheffield Neave in the case from Khartoum. A few days later I took in an Indian from Delhi with an enlarged spleen, and in him I also found bodies identical with the other two cases. (Details of these cases follow.)

We must therefore add Arabia to the countries in which this parasite occurs, and since the Hedjaz is the place of pilgrimage of the whole Mohammedan world, we may have to reckon with a parasite of great import. Further it has been found in Delhi boil, it may also be found in the Aleppo boil of Arabia.

Taking into consideration its occurrence in Arabia and the great prevalence of chronic enlargement of the spleen in Egypt, one would not be surprised at finding it also in the dwellers of this country. This surmise has proved correct, I have since found it in a native of the Menufiah province of Egypt, the body occurring in fair numbers. I have also found it in another case of a native Egyptian in small numbers.

My house physician, Dr. Iscander, who has helped me in the preparation of the films, has pointed out to me that in the cases in which the parasite has occurred, splenic puncture has been followed by a rise of temperature, but in cases in which it has not been found, no such rise has taken place.

As the following short notes show, the clinical aspects of the cases closely agree with the clinical aspects of the cases described in India.

(1) Abdu Rashid, a Turk, aged 30, was admitted into Kasr-el-Ainy Hospital on June 16th, 1904, complaining of pain after food, and giddiness on slight exertion, constipation and the occasional passage of a few drops of blood after defæcation. He had lived for the last two years in Yemen, in Arabia. He states that a month and a half ago he had an attack of diarrhœa with tenesmus and blood in the stools, this stopped under treatment. About the same time he had an attack of fever which began with rigors and which lasted during the period of the diarrhœa. The physical examination revealed that he was anæmic. His spleen was enlarged, reaching nearly to the umbilicus, the extent of the enlargement below the ribs being 7 cm. No malarial parasites were found in blood. The blood count showed anæmia. There was nothing else worthy of note in his physical examination. During his stay in hospital his temperature ranged from 36° to 37° C. and rose after splenic puncture to 38·5° C. The parasites occurred in large numbers in his spleen pulp.

(2) Hassan Mohammed el Naggar, an Egyptian, aged 35, was admitted into Kasr-el-Ainy Hospital, on June 19th, 1904, with œdema of the legs. The patient had lived for the last fifteen years in the Hedjaz, in Arabia. For the last two years he had suffered from attacks of fever characterised by rigors and ending with sweating. During this same period he had also had irregularity of the bowels with occasional tenesmus and passage of blood. He was emaciated, anæmic, and had œdema of the lower extremities. This latter had been present for three months. His spleen was found to reach 6 cm. below the ribs in the nipple line. The liver could also be felt enlarged. There was a systolic murmur to be heard over the cardiac area, and he passed daily 3,000 to 5,000 cc. of urine of low sp. gr. His temperature was irregular, ranging from 36° to 38° C., and during the first twelve days of his stay in hospital he had diarrhœa. The parasites were abundant in his splenic pulp.

(3) Ahmed el Zanati, aged 30, an Egyptian from the province of Menufiah in Lower Egypt. Occupation, fellah. He was admitted to Kasr-el-Ainy Hospital on June 30th, 1904. For the last six months he has had attacks of fever, the fever coming on every evening and lasting four days and then subsiding without treatment. During the attacks he used to feel pain in the left side and in the lower part of the abdomen. Three months ago he noticed distension of the abdomen coming on, and he became unable to do any manual work. At the beginning of the illness there was looseness of the bowels, blood also was

passed in the motions, and defæcation was accompanied by tenesmus. The physical examination revealed anæmia, this was accompanied by a soft systolic murmur over the mitral and pulmonary areas. There was slight œdema of the feet. The spleen was enlarged and extended 6 cm. below the ribs. There were no signs of free fluid in the abdominal cavity. Splenic puncture, as already stated, revealed the organism in fair quantities. His temperature during his stay in hospital ranged from 36° to 38° C., rising to 38° C., and to 37·5° C. after splenic punctures. There was slight looseness of the bowels during his first few days' stay in hospital.

(4) Ibrahim Rakah, aged 14, an Egyptian, from the Gharbieh province of Lower Egypt, a fellah, was admitted to Kasr-el-Ainy Hospital on July 4th, 1904. Two years ago he was attacked by fever, there were three separate attacks, each lasting about a week, and characterised by a rise of temperature in the afternoon preceded by shivering and followed by sweating. He was anæmic (3,000,000 red blood corpuscles being present), and examination revealed a systolic murmur over the mitral area. The spleen was enlarged, reaching 10 cm. below the ribs, and the liver was also enlarged, reaching 6 cm. below the costal margin. Splenic puncture yielded blood containing but few organisms, but these were present in sufficient number to be sure of their presence. In him also the temperature rose after splenic puncture, reaching 37·8° C. There was some looseness of the bowels during his first few days' stay in hospital.

ALL-METAL GLASS COVER HOLDER.

By Edward Horder, F.R.C.S.Edin.

Due to the use of wood in their composition, some holders offered for sale are liable to warp in the Tropics; others are limited in their usefulness, being made to receive but one size cover-glass; while in another, the worker is prevented placing his specimens in an oven, owing to the employment of indiarubber in its construction.

In consequence of these drawbacks of other frames, I have designed an *all-metal* holder, capable of receiving any size cover-glasses between 15 and 26 mm., a sufficient range, probably, to meet the requirements of all workers. It has the following advantages:—

(1) It will receive glass covers of any size in general use.

(2) Being made entirely of metal, it can be easily washed or sterilised.

(3) Specimens requiring heat can be placed in an oven with the films in position, without fear of ruining the holder.

Square or oblong cover-glasses are recommended.

Having used a cover-glass holder for some years, I can endorse Major Marshall's remarks in the *Lancet* as to the general advantages of such an instrument when making blood films, viz.:—

"*Saving of time* at the bedside. No time is wasted choosing and picking up cover-glasses."

"*Cleanliness.*—The cover-glasses need never be fingered. When prepared, the instrument can be wrapped in paper, or dropped into a small metal box, contamination of the films by dust, &c., being thus avoided."

Directions for use.—With the holder between finger and thumb of left hand pull sliding bar with the right until the opening is a little wider than necessary. Place cover-glasses on base-plate, bring sliding bar into apposition with covers, and the holder is prepared for taking a "spread." A small projecting pin at end of plate secures covers from sliding off. The groove along centre of base-plate will enable the operator to remove cover-glasses easily by means of forceps.

Messrs. C. Baker, of 244, High Holborn, London, W.C., supply the holder.

Dysentery.

Rosenthal, L., Ein neues Dysenterie-Heil—Serum und seine Anwendung bei der Dysenterie. *Deutsche Medicinische Wochenschrift*, vol. xxx., No. 19.—Rosenthal describes a new anti-dysenteric serum obtained by inoculating animals first with dead cultures, secondly with living cultures, and thirdly with toxins. The treatment appears to be successful at all stages of the disease, but especially when given early.

Tuttle, James P. Amœbic Dysentery, its Local Lesions and Treatment, *Medical Record*, 1904, June 25th, p. 1060.—Dr. Tuttle presumes that the invasion of the colon by the amœba dysenteriæ was the cause of amœbic dysentery. He states that at the body temperature the life of the amœba was indefinite, but at a temperature below 70° F. the amœba dies. The treatment of dysentery, due to the amœba, is directed to the destruction of the parasite and the prevention of the development of the spores. This is accomplished by washing out the large bowel with cold water, which is allowed to run in slowly whilst the patient is in the knee-chest position, from a bag elevated some 3 ft. above the level of the patient's hips. The amount to be used is regulated by the patient's sensations. In the discussion on the subject, Dr. F. Truck stated that he employed hot water as a means of treating amœbic dysentery, beginning with water at a temperature of 115° F., and gradually raising it to 130° F. By this means the amœbæ were killed and washing out with ice cold water completed the cure.

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BRITISH MEDICAL ASSOCIATION, OXFORD.

THE SECTION OF TROPICAL DISEASES.

Wednesday, July 27, 1904.

UNDER the Presidency of Alexander Crombie, C.B., M.D., Lieutenant-Colonel I.M.S., the Section of Tropical Diseases of the British Medical Association held its eighth consecutive meeting. The attendance at the Section during the opening day numbered no less than seventy-three members, and we were glad to notice many men well known in tropical medicine amongst the audience. The President chose as his subject for the opening address, "THE FALLACY OF FINALITY," and gave a most interesting and instructive account of "certain fevers of the continued type," a subject which he has made peculiarly his own.

Since Dr. Crombie read his paper on "Indian Fevers," at the Indian Medical Congress of 1894, a considerable amount of criticism has been devoted to his statement that in hot climates fevers of a continued type, other than typhoid and malarial remittents, form a definite group of ailments. The clinical experience of many observers favours Dr. Crombie's views, and it would seem that his opinions still hold their own in spite of recent bacteriological research and pathological investigations. Dr. Crombie remarked that "ague" is not the most prevalent type of fever in any of the parts of India of which he has had experience. The commonest type of fever is what he terms a "single paroxysm fever." If it lasts a few hours it is termed "ephemeral fever"; if a day or two "febricula"; if several days "simple continued fever." These attacks of fever give no clinical evidence of periodicity, the malarial parasite is not present, and the patients recover without quinine.

His observations are confirmed by Captain James, who concludes, from extensive observations, that many cases of "fever" he examined were not due to malaria. "Non-malarial remittent" fevers form a group, according to Dr. Crombie, distinct from "Malta fever," to which they have been referred by some; whilst others, after a careful study of non-malarial remittents, concluded that they were typhoid fever, but both these contentions are practically refuted, and since the discovery of Leishman's bodies a key to the cause of many of the non-malarial remittent fevers has been found. The "Urban fever," described by Crombie in 1894, he is now inclined to look upon as a "bastard typhoid." Enteric fever Crombie regards as a mixed infection, the symptoms and severity varying with the amount and quality of the mixture.

The discussion on "TRYPANOSOMIASIS" was opened by Colonel David Bruce, F.R.S., R.A.M.C., and was continued by Sir Patrick Manson, F.R.S., Drs. Nabarro, C. Christy and L. Sambon. Papers were read on the following subjects:—

(I.) "TRYPANOSOMIASIS AND ITS RELATIONS TO CONGO SLEEPING SICKNESS" (The Second Progress Report of the Liverpool School of Tropical Medicine, during the expedition to the Congo in 1903), by Drs. C. Christy, Dutton and Todd.

(II.) "SUPPLEMENTARY NOTES ON THE TSETSE

FLIES (genus *Glossina, Wiedemann*), by Mr. Ernest E. Austen, of the British Museum.

(III.) "CEREBRO-SPINAL FLUID IN SLEEPING SICKNESS" (*Trypanosomiasis*), by Dr. C. Christy.

(IV.) "A NEW TREMATODE OF MAN" (*Amphistomum Watsoni*), by Dr. H. F. Conyngham, Demonstrator London School of Tropical Medicine.

(V.) "THE TREATMENT OF SNAKE BITES," by Leonard Rogers, M.D., Capt.I.M.S.

(VI.) "FLOOR MAGGOTS" (*A Blood-sucking Dipterous Larva found in the Congo Free State*), by Dr. C. Christy; the discussion was continued by Drs. D. E. Anderson, of Paris, and T. J. Tonkin.

LEISHMAN-DONOVAN BODIES.

By SIR PATRICK MANSON and G. C. LOW.

The Leishman-Donovan Body in Ulcerated Surfaces. A possible route of its escape from the Human Body.

IN the *British Medical Journal* of May 28th we described the presence of Leishman-Donovan bodies in the lymphatic glands of the mesentery. In later work it has been found that the distribution of the parasites in the glands is not uniform, some containing none, some a few, others enormous numbers.

A careful examination of the intestine of the case before-mentioned revealed a small ulcer about 12 inches above the ileo-cæcal valve, three small punched-out ulcers at the splenic flexure, and two areas of atrophied mucous membrane, one 15 inches or thereabouts above the cæcum, the other in the upper part of the ileum.

The mesentery presented numerous small nodules, somewhat resembling minute tubercles; similar nodules were present on the peritoneal surface of the small intestine, and also at the base of the small intestinal ulcer.

Microscopically the intestine exhibited areas of small-celled infiltration between the mucous glands and in the submucous coat, the atrophied areas showing similar though more advanced changes, most of the mucous membrane having disappeared.

In the infiltrated areas of the small intestinal ulcer, and in one of the ulcers from the large intestine, Leishman-Donovan bodies, few in number, it is true, but unmistakeable, were found; they were enclosed in cells. In the other areas no parasites were detected, but as the bodies were so few in the ulcers it is possible that they may yet be found here also.

In sections of liver, spleen, and lymphatic glands the position of those bodies is undoubtedly, in the majority of instances, intracellular. In many cases the protoplasm of the cell is swollen, the nucleus staining faintly or having disappeared.

We have never seen the parasites in the red blood corpuscles in sections or otherwise. Wright and James have found the Leishman-Donovan, or a similar organism, in ulcers of the integuments (Oriental sore), Christophers in intestinal ulcers. The foregoing note again records their occurrence in ulcers of the intestinal mucosa, and this is interesting in view of the fact that dysenteric ulceration is a very usual termination for kala-azar.

Failing the discovery of any other means of exit from the body, may it not be that the normal route of escape for the parasite is by an ulcerated surface? With this idea in view we lately produced by croton oil and liquor epispacticus, slight ulcerating dermatitis in a patient with Leishman-Donovan bodies in his viscera, but failed to find the parasites in the discharges. This experiment cannot, however, be considered conclusive, as we were afraid, in the interests of the patient, to produce anything like deep ulceration.

The above observations confirm, then, the work of Christophers recently published in India, and are of interest in showing that these parasites may escape by the intestinal canal.—*British Medical Journal*, July 2nd, 1904.

LONDON SCHOOL OF TROPICAL MEDICINE.

OF the thirty-nine students who attended the above School during the Session, May to July, 1904, the following have passed the examination at the end of the course with distinction:—

P. N. Gerrard	(Colonial Service).
J. Currie	,, ,,
A. King	,, ,,
E. Maples	,, ,,
C. A. Suvoong.	

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By FRITZ SCHAUDINN (Rovigno).

(*Translated from the German by P. Falcke*).

(*Continued from p.* 228).

(*e*) CONDITION OF THE INDIFFERENT TRYPANOSOMES IN THE BLOOD OF THE OWL.

THE indifferent trypanosomes reaching the blood have usually gone through a lively period of propagation shortly before the inoculation, and are therefore mostly very minute. The larger forms amongst them may again immediately multiply by longitudinal division. The small forms attach themselves to erythrocytes, and commence to go through an interval of rest and growth. On attachment, which is always in a position parallel to the surface and by means of the flagellated extremity (fig. 6 *a*), the flagellated apparatus becomes abbreviated. The blepharoplast moves close to the nucleus (fig. 6, *b*), the body gradually sinks more deeply into the erythrocyte,

as was stated by Argutinski[1] to be the case in the tertian parasites of man, and thereby absorbs the concentrated substance of the blood corpuscle. The form of the body is that of a young Halteridium (fig. 6, *b*); after twenty-four hours the first granules of pigment also appear in the plasma. Soon, however, the parasite again leaves its cellular host without having essentially damaged it, for in the blood as well as in the body of the mosquito, periods of rest and movement always alternate. The young parasite, which has grown to about double its size (fig. 6, *c*), at once assumes the form of a worm (fig. 6, *d*) and then, in the way we are acquainted with, develops a flagellate apparatus. It mostly again becomes a trypanosoma (fig. 6, *e*). The migration of the parasite from out of the blood corpuscle, or rather from its surface, usually takes place in the night, the parasites preferring the interior organs, particularly the bone-marrow, spleen, kidney and liver, in which there is a slower circulation of the blood.

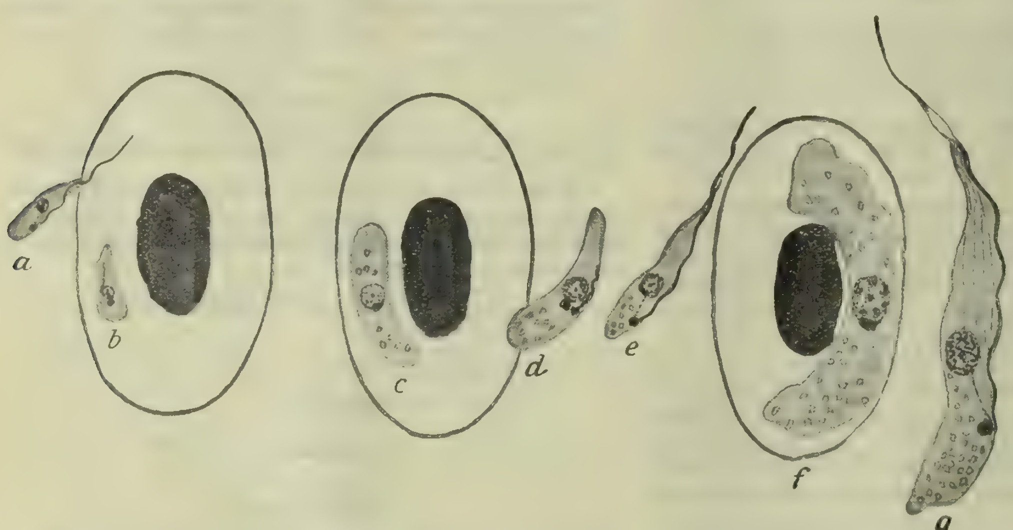

FIG. 6.—*a*—*g*, SCHEMATIC ILLUSTRATION OF THE CONDITION OF THE INDIFFERENT TRYPANOSOMES IN THE BLOOD OF THE OWL. *a*, Attachment of the youngest stages to the erythrocyte, with the anterior extremity; *b*, stage of rest of the young stages; *c*, their stage of rest about forty-eight hours after the first attachment; *d*, migration in the gregarine-like condition, commencement of the development of the flagellate apparatus; *e*, the free motile trypanosoma developed from 6, *d*, which has again attached itself to an erythrocyte; *f*, condition of rest five days after the first attachment; *g*, fully developed trypanosoma.

This process of migration, however, is occasionally demonstrated in the peripheral blood also. I conjecture that the night time is chosen because then the body temperature of the bird is considerably lower. These processes will be described in detail in my book. Here I will only indicate the results. After a period of motility in the trypanosoma condition, the parasite again attaches itself and grows until the next night, when the same process is repeated. It is only after six days that it attains its full size; it now again migrates and multiplies by quickly consecutive longitudinal divisions, until the products of division have attained the lowest limit of size. The small flagellata then again attach themselves to the blood corpuscles, and this development commences anew and continues until the entire blood swarms with parasites. Fig. 6, *a* to *g* should elucidate what I have here described.

The six-day period of development of Halteridium is well-known; we also know that the parasites neither decolourise the red blood corpuscles nor deform them, although, like other Hæmosporidia, they produce pigment which is a product of transformation of the hæmoglobin. This has hitherto been a puzzle, but the cycle of development here described should explain the phenomenon. The worm-like stages have already often been seen. Danilewsky also appears to have already observed the trypanosoma, as well as to have correctly confirmed their multiplication, in the bone marrow. By means of my observations the circumstance why most authors could never find the multiplication of the Halteridium insisted on by Labbé is further elucidated. They do not exist at all in this form, and perhaps not at all in many related forms. I do not, however, on that account doubt that Labbé observed them in the lark, for one must never without further proof conclude from one form that another exists, although many stages of development appear to be alike. The propagation of Halteridium, which Labbé confirmed, may easily have developed phylogenetically from the multiplication here described. One need only take it for granted that the parasite finally no longer becomes free again, and successively divides during the resting stage, or even in the cell-host, and there we have the multiple propagation. It is presumed most of the Hæmosporidia have adopted this method in their phylogeny (*Piroplasma*, *Plasmodium*, *Proteosoma*, *Karyolysus*, &c.).

(*f*) CONDITIONS OF THE FEMALE TRYPANOSOMA IN THE BLOOD OF THE OWL.

The female forms vary somewhat in the blood of the bird according to their age. Large females laden with reserve materials are probably not able to pass through the proboscis of the mosquito, they therefore do not attain the blood. The younger stages, in contradistinction to the indifferent forms, penetrate into the erythrocytes where they grow, but much more slowly than the others, meanwhile depositing more and more reserve materials in their plasma. They appear to change the host-cells more rarely, and in their later

[1] *Arch. Mikr. Nat.*, v. 59, p. 345.

stages of growth are no longer able to assume the form of the trypanosoma; they then, as in the intestine of the mosquito, migrate as gregarine-like vermicules, and in the same form again penetrate into the erythrocytes. As they do not lie on the surface of the blood corpuscles they are more capable of originating greater alterations in the structure of these cells, particularly in their older stages, when they frequently force the nucleus to one side. They also cause a considerable dehæmoglobinisation of the cell. The adult mature macrogametes which are no longer capable of migration, are therefore regularly found only surrounded by a pale residue of the cell, the nucleus of which is then situated quite at the periphery. I have already mentioned that the macrogametes alone remain at the end of the acute stage of the halteridium disease, and that after long intervals they are capable of reviving a relapse, as they are able by means of the parthenogenesis described above to reproduce all forms of the parasite. It was likewise stated that the number of the female forms was recruited from the indifferent forms, and that the latter even in their minute stages exhibit female characteristics, so that the forms that will ultimately become macrogametes may be differentiated by means of the state of their plasma and nucleus even at the commencement of their growth. These conditions also prevail in plasmodium vivax as I have said. Otherwise the macrogametes present nothing remarkable. Their form, like their structure, has already been described by less recent investigators. The coarsely granulated plasma, the relatively small nucleus, which lies adjacent to the equally small blepharoplast, cause the adult females of halteridium to be easily recognisable. The fertilisation, as is known, takes place at the moment when the parasites leave the blood. I will refer to this later on.

(*g*) The Condition of the Male Trypanosoma in the Blood of the Owl.

The case in which male forms still living attain the blood with the puncture of the mosquito, does not occur frequently. When, however, it happens, these stages must die off as quickly as they do in the body of the mosquito. The microgametocytes in the blood, like the macrogametes, are always recruited from the number of indifferent trypanosomes of Halteridia. The process quite corresponds with the conditions which I have elsewhere minutely described, this taking place with malaria parasites, *i.e.*, the microgametocytes develop from the smallest indifferent forms originated by fission, and from the commencement, their pale plasma, coarse pigment and large nucleus and blepharoplast, mark their male type. The division of the adult microgametocytes to the eight microgametes quite corresponds to the processes which I have described of the development of the male trypanosoma from the ookinets. On a more minute study of the adult microgametocytes, we find that the apparently single nucleus which has been described by all the authors is remarkably large and is not one single nucleus, but consists of a closely packed group of eight double nuclei, *i.e.*, eight nuclei each with four chromosomes with eight blepharoplasts belonging thereto, with the centrosome and eight chromosomes each. As mentioned above, the reduction of the number of chromosomes of the nuclei before their second separation from the parent nucleus, takes place under the formation of each four groups, which are divided up in the second and third divisions so that then four single chromosomes remain. The reduction of the blepharoplasts in the macrogametes only takes place subsequent to fertilisation. The complete fertilising microgamete is of the following structure: the nucleus and plasma consisting of four chromosomes together form an elongated filament as an axis for the entire body; somewhat behind the centre of this axis is the blepharoplast, likewise elongated with its centrosome and eight chromosomes. Behind this group and inserted at one spindle-pole, the centrosome of which is often quite perceptible, is the flagellate apparatus.

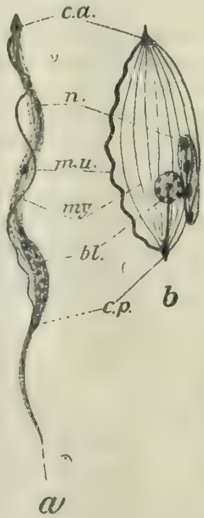

Fig. 7*a*.—Scheme of the Structure of a Perfect Microgamete.

Fig. 7*b*.—Schematic Illustration of its Nuclear Apparatus. *bl.*, Blepharoplast; *c.a.*, anterior centrosome; *c.p.*, posterior centrosome; *m.u.*, margin of the undulating membrane—central spindle; *my.*, myonema—mantle fibres.

It extends towards the front up to the point of the axis at which the second centrosome of the spindle lies. The central spindle represents the excentric undulating membrane, which in this case does not extend as a flagellum beyond the point, but terminates with the centrosome transformed into a point. The eight mantle-fibres form the muscular sheath round the anterior part of the spermatozoon. Fig. 7 represents these conditions; in 7*a*, the entire microgamete is shown; in *b*, only the skeleton of the nuclear apparatus. We observe that the microgamete, up to the finest details, not only conforms with the scheme of the trypanosoma, but also to the scheme that the most recent cellular investigations of the spermatozoa of the higher animals has revealed. I hope to be able to carry out this homologisation in my complete work.

(*To be continued.*)

Obituary.

We regret to see the announcement of the death, at Zagazig, from bubonic plague, of Dr. Noel Unsworth, Assistant Inspector of the Sanitary Department of the Egyptian Government. Dr. Unsworth received his medical education at St. Thomas's Hospital, and obtained the diplomas of M.R.C.S., L.R.C.P., in 1899, and went to Egypt as Assistant Surgeon to the Kasr-el-Ainy Hospital, Cairo.

Notes and News.

The Dissemination of Plague in India.—At a meeting of the General Plague Committee in Lahore, held early in June, attention was drawn to the possibility of spreading plague by some of the practices followed by Hindus and Muhammadans. It was stated that when the Hindu dies, his wearing apparel, bedding and other clothing in use by him during illness and at the time of death are given away to sweepers, and in the case of Muhammadans are handed over to the Durvesh in charge of the local mosque, as a payment for giving the dead his last bath. These practices were condemned at the meeting, and as they bear no religious significance there should be no difficulty in removing what must be a source of disseminating plague, by burning and burying the materials and providing a small monetary compensation to the sweepers and Durveshes who are deprived of their perquisites. Amongst Muhammadans, after the burial ceremony is over, the bedstead, which as often as not is obtained from the mosque, where it is kept for the common use, is sent back after the ceremony to the mosque or dwelling house, without being disinfected. The covering for the corpse and the mat spread on the *charpai* are likewise preserved and utilised, and become sources of infection. According to Muhammadan rites these articles should not be destroyed, and disinfection is not popular. It is hoped, however, from the example set by the better class Muhammadans, that these insanitary customs may be mended.

Plague in Tonkin.—By its proximity to the Chinese plague centre of Yunnan, Tonkin is fated to become contaminated. However, there was no contamination in 1900. M. Rouffiandis, First Assist.-Surg. of Colonial troops, has just published a *brochûre* on this subject, and we quote the following: "*Le Caducée*, June 18th, 1904, Paris.—At Hanoi the first plague case occurred in an Annamite employed at a tailor's. At the inquest it appeared that a number of plague-stricken rats had been found in the workrooms of this house, having been contaminated by rats imported from Hong Kong in bales. Apart from this contagion by the sea, plague penetrated Tonkin by land, *viâ* Langson and Dong-dang. There exists really two plague centres, first, Hanoi; second, Langson and Dong-dang.

"The epidemics of plague show every year a rapid augmentation in intensity and duration. The total number of known cases is 229, with 156 deaths; but many cases pass unperceived, whether by errors in diagnosis or by the natives hiding them to escape prophylactic measures. The statistics are: In 1899, 1 case, 1 death; in 1901, 2 cases, 2 deaths; in 1902, 32 cases, 20 deaths; in 1903, 134 cases, 124 deaths."

M. Rouffiandis makes the following remarks: Plague threatens to become endemic in Tonkin, and it must be added to the list of contaminated places. Up to 1899 plague was unknown in any French colony, but four colonies are now infected. Plague was imported into Madagascar in November, 1899; into New-Caledonia in December, 1899, and into Reunion in 1900. France cannot envy England possessing such a plague centre as India, from whence many of her colonies have been contaminated, viz., Australia, Mauritius, the Cape and the Transvaal.

Hong Kong Maternity Hospital.—In connection with the Alice Memorial Hospital, where for well nigh twenty years excellent work has been done in all branches of medicine and surgery, a Maternity Department was opened on June 7th, 1904. The hospital is quite complete in itself with operating-rooms, a large general and several special wards, nurses' quarters, drying and bath-rooms and a lecture-room. The building is adapted to a tropical climate, having a ventilated space under the ground-floor and all timbers left exposed to air where practicable. The ward windows are provided with glass sashes, mosquito net sashes and jalousies, hung so that a third, two-thirds, or the whole window, may be opened. The main floors are of hard wood and beeswaxed. The hospital has been erected chiefly by the untiring efforts of the Hon. Dr. Ho Kai, to whom also, in conjunction with the London Missionary Society, the Colony is indebted for the Alice Memorial Hospital. Dr. R. M. Gibson has been associated with Dr. Ho Kai in bringing the Maternity Hospital to completion. The opening ceremony was performed by Mrs. F. H. May, the wife of the acting governor of the Colony of Hong Kong.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Government Civil Hospital, Hong Kong.

During the year 1903 the more serious ailments treated in the Hospital were:—

Dengue Fever.—123 cases against 422 in 1902. The epidemic commenced in August and lasted until October.

Dysentery.—50 cases (with 11 deaths) against 74 in 1902.

Hepatic Abscess.—5 cases with 4 deaths.

Malarial Fever.—346 cases against 349 in 1902 and 787 in 1901. Two deaths only are attributed directly to malaria.

Typhoid.—28 cases against 34 in 1902, and 6 deaths against 8.

At the Infectious Diseases Hospital.

Cholera.—12 cases, 1 death.

Plague.—301 cases, 176 deaths. The mortality among Europeans amounted to only 7·4 per cent., but amongst Chinese it reached 77·2 per cent. and amongst other races 28·2 per cent. The treatment relied upon was carbolic acid; 12 grains or more every two hours given in these heroic doses for several days, and continued in lesser quantities so long as the plague bacillus was found in the blood or secretions, gave encouraging results.

Natal.

Report of the Health Officer for 1903.

In this, the second Annual Report of the Department of Public Health for the Colony of Natal, by Ernest Hill, M.R.C.S., L.R.C.P., D.P.H., we find much to interest and instruct.

Vaccination.—The Vaccination Acts have, in respect of Europeans, fallen into desuetude. Natal, as far as Europeans are concerned, remains an "unvaccinated country." It appears that, instead of being under the Department of Public Health, the administration of the Vaccination Act is under a Board of Health, which has not held a meeting for years. Such a state of affairs is but too common in several parts of the Empire, and it seems to require the devastating effects of an epidemic to rouse public attention in matters of public health.

General Sanitary Matters.—In several towns and boroughs there is some evidence of improvement in sanitary administration, but much remains to be done. Plague in Durban drew public attention to sanitary matters generally, but with the passage of the outbreak a laxity in measures calculated to avert disease ensued. The European population of Natal is 92,000; the deaths during the year numbered 1,187, or 12·90 per 1,000 living per annum. The Indian population is estimated at 86,000, and the death rate amounted to 19·39 per 1,000.

Diseases.

Enteric Fever.—Amongst Europeans there were 84 deaths (0·91 per 1,000), and amongst Indians 17 (0·19 per 1,000) deaths from typhoid. The prevalence of enteric fever in towns and villages, and to no small extent in houses in isolated positions in the country, points to carelessness in the disposal of night-soil and urine, allowing of the dispersion of the bacillus by flies or dust infecting food or drink.

Tuberculosis is reported to be on the increase among natives. Immigrants from Europe who come to Natal infected with tuberculosis, constitute a danger to the general health of the people, especially when it is necessary for such persons to obtain immediate work to ensure a livelihood.

Leprosy.—There are now 21 native lepers on the excellent location for lepers on the Coast of Zululand, on the Matikulu River.

Dysentery.—In the Hospitals of Dundee, Newcastle and Charlestown, the number of cases of dysentery (and enteritis) numbered 15, of which 4 died.

Malarial Fever.—In the same hospitals 2 cases of malaria were treated.

Plague.—During 1903 the plague cases numbered 208, and the deaths from the disease 157. The distribution among the different races was as follows: Europeans 20 cases, 5 deaths; mixed races, 7 cases, 7 deaths; Indians, 87 cases, 71 deaths; natives, 94 cases, 74 deaths. Other diseases mentioned as occurring in the Colony of Natal are: Rheumatism, scurvy, small-pox (all in natives), whooping cough, croup, diphtheria and measles; one case of liver abscess is noted (European), and 1 case of cancer of the liver in a native.

The excessive mortality in certain estates and mines notified in 1902, lessened during 1903.

Owing to want of the adequate machinery it is well-nigh impossible to get accurate estimates of the state of the public health in Natal, but in view of this want the Medical Officer of Health is to be congratulated upon the report for 1903.

Cholera.

Turkey in Asia.—To May 9th, 165 cases, 130 deaths.

Plague.

Prevalence of the Disease.

India.—During the weeks ending June 18th, 25th, and July 2nd, the deaths numbered 5,929, 2,873 and 2,688.

Cape Colony: Port Elizabeth.—During weeks ending June 25th and July 1st, fresh cases 1 and 2, deaths 1 and 2.

Transvaal.—During the weeks ending July 6th, telegram states, "no change."

Hong Kong.—During weeks ending July 9th and 16th, fresh cases 24 and 20, deaths 21 and 20.

Mauritius.—During weeks ending July 14th and 21st, fresh cases 2 and 1, deaths 2 and 0.

Honolulu.—June 8th, 1 death.

Plague in Natal.

Health Officer's Report for 1902-3.

The report of the outbreak of plague in Natal, by Ernest Hill, M.R.C.S., L.R.C.P., D.P.H., Health Officer for the Colony, amounts to a short treatise on plague, extending to 192 pages, with maps, diagrams, photographs and charts.

The first case of plague in the Colony was observed in Durban on December 4th, 1902, and the last case in the same town on August 15th, 1903. During the period 221 persons contracted plague, of whom 162 died, a case mortality of 73 per cent.

Some important epidemiological points are plainly stated by Mr. Hill, for instance: (*a*) No evidences of any abnormality in the death rate or in the causes of deaths were noticeable before plague appeared in Durban. (*b*) Plague-infected rats were discovered the day before the first case of plague in human beings was notified. Another very important point touched upon is the disposal of the dead, and the life of the bacillus in the earth. A series of experiments with this end in view showed that the bacillus of plague is incapable of extended life in soil either on its surface or at a depth of about one foot. The exact period of its existence

in the soil may vary no doubt, but four to five weeks seems the extreme limit during which it is possible to remove the bacillus after burying the animal dead of plague, or from cultures placed in the soil. The disposal of those dead from plague would therefore seem to be a matter of indifference as far as infection of the soil is concerned, but how far worms, moles, and other underground animals are infected by plague or are media of propagating and conveying the disease, yet remains to be solved.

Mr. Hill is unable to confirm Professor Simpson's observations made in Hong Kong, as to the infectivity of domestic animals, and states, that so far as Natal is concerned, these animals are not to be looked upon as factors concerned either with the spread of the disease or with its periods of latency. We, however, are not willing to accept Mr. Hill's dictum that this is a question of academic interest for the most part, for it would seem to be the one important factor in the continued prevalence or the arrest of plague in any given district. If the domestic animals are not infected, the eradication of plague would seem hopeful and possible within a limited period, but when such animals are infected the eradication of plague is difficult in the extreme.

The bacteriological difficulties encountered during the course of the outbreak were skilfully and scientifically dealt with. The diagnosis of plague by means of the microscope was proved to be frequently fallacious, even when supported by clinical evidence. Even inoculation experiments were at times inconclusive, and the cultural characteristics and virulency of the organism are to be alone relied upon. Considering, however, the variety of plague organisms, in their appearance, in their evident virulence, in their variation as regards their power of infecting domestic animals, it is possible that those organisms met with in several diseases, indistinguishable from plague and pronounced by all tests, except the cultural, to be plague, are, after all, pestis in some form. If cultural tests were infallible we would be compelled to doubt the evidences of our senses, but bacteriology has not yet reached the stage of an exact science, and we still hesitate to allow of its definitely upsetting every other available means of diagnosis.

This report is so complete, so well handled, and the conclusions so scientifically worked out, that we are tempted to go beyond the mere notice of the book and to discuss or mention every paragraph.

Sleeping Sickness.

Brumpt and Wurtz. "Experimental Sleeping Sickness." *Presse Médicale*, 1904, vol. i., No. 27.

Dupont, H. Maladie du somnieil. *Bulletin de l'Academie de Médecine*, Paris, 1904, vol. lxviii., No. 18.—Dupont gives details of three cases of sleeping sickness occurring amongst Europeans on the Congo.

Huitse, K. "Sleeping Sickness in Togo."—*Deutsche Medicinische Wochenschrift*, 1904, vol. xxx., No. 22.

Yellow Fever.

Costa Rica.—May 21st to June 4th, 3 cases.

Ecuador.—May 21st to May 25th, 24 deaths.

Mexico.—May 20th to June 11th, 23 cases; deaths 5.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

A New Tape Worm.

The Diprognopolus Grandis.

Dr. T. Kurmioto, in a paper read at the Tokyo Medical Society, describes a tape worm which he has found in the human intestine on two or three occasions. In 1882 he first found this parasite, but until quite recently he has had no opportunity of ascertaining the exact nature of the worm. The chief distinctive feature of the worm is that it possesses in each segment a double uterus, one in either side of the segment, hence the term "diprognopolus." The worm is also of immense size when full-grown, measuring 10 metres in length and $1\frac{1}{2}$ centimetres in breadth, hence the name "grandis."

The worm described by Kurmioto in some respects resembles the *Bothriocephalus latus* and it belongs to the same species. In the bothriocephalus the new segments are formed immediately behind the head; but in diprognopolus the individual segments become separated into two, and the old and young segments are alternate in their distribution, in consequence of which the last segment is not necessarily the oldest, as in the commoner varieties.

Administration of Antipyrin.

A. Martinet, in *Ther. Gazette*, states that antipyrin should never be given in capsule form, as it is very irritating to the gastric mucous membrane. It is generally so administered because it is cheaper, but in solution it is preferably prescribed. It is recommended given in combination with sodium bicarbonate as follows:—

℞.	Antypyrini	ʒss.	2
	Sodii bicarb.	ʒi.	1
	Syr. aurantii	ʒiii.	12
	Aq. destil.	ʒxii.	48

M. Sig. One tablespoonful as indicated.

Antipyrin should always be administered outside the period of digestion, that is half an hour before meals or one and a half hours after meals. It is not advisable to administer it hypodermically, as it is liable to cause local disturbances. In epistaxis it is of service applied locally as a hæmostatic. — *Jour. Amer. Med. Assoc.*, July 2nd, 1904.

Ankylostomiasis.

Manouvries, A. Anemie Ankylostomiasisque des Miners. *Bulletin de l'Academie de Médecine*, Paris, 1904, vol. lxviii., No. 18.—In mines well ventilated ankylostomiasis is less prevalent, owing to the lower temperature of the air being unfavourable to the growth of ankylostomata. Wood, especially with the bark on, when used as props in mines is liable to harbour the parasite.

Bacterium Coli Infection.

Sicuriani. F. "A Special form of Intestinal Infection due to Bacterium Coli." *La Reforma Medica*,

Absent:—Major F. W. Thomson, I.M.S., S. G. Wakeling, P. N. Gerrard, Miss Lea-Wilson, J.H. Paterson, Lieut.-Colonel Hendley, I.M.S. R. H. Bremridge, J. D. Finlay, G. Elliott.

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2nd Row: Mr. Stanford Smith, Dr. Brown, V. Jenson, A. G. Christian, E. Echeverria, D. Bridges, A. King, B. M. Wilson, W. Fisher, C. R. Howard, J. Currie, E. E. Maples, C. A. Suvoong. (Senior House Surgeon).

3rd Row: Robert (2nd Lab. Assistant). C. Term. Dr. Kirk (*Singapore*). Mr. Goadby (Lecturer). Mr. Johnson Smith. Sir Patrick Manson, K.C.M.G. (Lecturer). Dr. Crombie, C.B. (Lecturer). Mr. Michelli (Secretary). Dr. Low (Medical Superintendent). Rev. T. H. Gilbert (Chaplain). Dr. Conyngham (Demonstrator). H. W. Garder.

4th Row: A. D. P. Hodges, A. J. Milne, T. D. Moffat, M. R. Fernandez, P. Bolus (House Surgeon), F. C. McCombie, D. F. Sanjana. Charles (Laboratory Boy).

May 11, 1904. — Five cases of illness ascribed to infection of the intestine by the bacterium coli are described by Sicuriani. The condition induced was similar to typhoid in many ways, but the temperature was sometimes continuous, sometimes remittent or intermittent; the pulse and respiration were but slightly altered from the normal; no enlargement of the spleen, no diarrhœa, no eruption, no nervous symptoms were present, and the general condition was generally good. Micro-organisms were isolated from the fæces in the form of cocci, bacilli and diplobacilli.

Cholera.

Fullerton, E. B.—Treatment of Cholera, *Medical Record*, 1903.—Quinine, in doses of 15 to 20 grains, by the mouth, were found by Dr. Fullerton, during an outbreak of cholera in the Ohio Valley, to be efficacious.

Distomum Felineum.

Askanazy, A. Die Ætiologie und Pathologie au Kutzenegel—Erkran Kineeg des Menschen. *Deutsche Medicinische Wochenschrift*, vol. xxx., No. 19.—The Cat-leech (*Distomum felineum*) causes a specific set of symptoms in men. The intermediate host for the parasite is stated by Askanazy to be a river fish (*Leuciscus ratilus*). In the *post-mortem* examinations made on three cases, a colloid cancer growth was found in the liver in all, and distoma were found in the cancer tissues and the biliary passages adjacent.

Leishman-Donovan Bodies.

Guiteras, Juan. "Esplenomegalia Tropical. El Nerevo Parasito de Leishman-Donovan." *Revista de Medicina Tropical*, May, 1904.—Dr. Guiteras gives a review of the literature appertaining to the Leishman-Donovan "bodies" with personal observations.

Leprosy.

Dyer, J. Is Leprosy Curable? *Medical Record*, June 11, 1904.—In a letter to the *Medical Record*, Dr. Dyer states definitely that "I know no specific for leprosy." His treatment has been large doses of Chaulmoogra oil as crude as obtainable in the liquid state. To some patients he has given as much as two drachms at a dose. In twelve cases treated all evidences of the disease have been removed. In one case the improvement has lasted eight years.

Liver Abscess.

Cook, G. W. "Case of Abscess of Liver."—*Washington Medical Annals*, 1904, May.

Malaria and Typhoid.

Watkins, V. E. The Simultaneous Occurrence of Typhoid and Malarial Fevers in the Same Patient. *Medical Record*, June 25, 1904.—Two soldiers serving in Cuba are stated by Dr. Watkins to have had typhoid fever and malaria, as proved by Widal's reaction, and by finding in one case æstivo-autumnal, and in the other tertian, parasites in the blood.

Malta Fever.

Kennedy, C. A Sequela of Mediterranean Fever, *Journal of the Royal Army Med. Corps*, 1904, February.—From the fluid drawn from a greatly enlarged sub-deltoid bursa, Lieut. Kennedy, R.A.M.C., found organisms identical in character with the *Micrococcus melitensis*, and assumes that the severe local symptoms met with in Malta fever are probably due to an actual deposit of the coccus in the affected tissues.

Management of Fever in Childhood.

Murray, E. W. *Medical News, New York*, 1904, June 18.—Murray considers the physiology and pathology of fever and insists on the necessity of analysing the cause before any attempt is made at treatment. Each case is a law unto itself. As to the treatment, he says that with high fever we should stimulate with alcohol, but with depression strychnine is useful. Phenacetin is preferable to antipyrin or acetanilid, possessing the unfavourable features of the last two to a lesser degree. The coal-tar products should be used only in high fevers of short duration. In young children and infants, where there is not much prostration, rectal irrigation is of value. Where there is great prostration the ice cap or the sheet pack may be employed. His method is as follows: Remove the clothing, dip the sheet in warm water, wrap carefully and smoothly about the child; over this apply a second sheet wrung out of cold water; institute gentle friction with the hands to prevent capillary engorgement. Cold water is applied as needed. Two symptoms should be kept in mind—the character of the breathing and the tendency to cyanosis. If either occur, remove the child from the pack and place between warm blankets. Ordinarily the application is continued from ten to fifteen minutes, at the end of which time the child is to be rubbed until the skin is dry and glowing. Where the fever has been complicated by convulsions, apply cold baths to the head, or use the water-bag for a pillow, after the child has been put to bed. If the temperature is dangerously high, nothing is so effectual or so likely to save life as immersion in a tub of cold water, cooled by the addition of ice. The diet should be regulated carefully and elimination favoured. In ordinary fevers the food must be liquid and cool; in vomiting, cold; in respiratory diseases, warm; in collapse, hot. The best feeding time is the remission. When the evening rectal temperature is 100° F., or above, give milk containing 2 per cent. fat, 1 per cent. proteid and 5 per cent. sugar. When the temperature is lower than this full-strength milk may be used. When the temperature is steadily below 100° F., but above normal, give milk, bread and butter with the first, third and fifth meals, broth, dextrin and biscuit with the midday meal. When the evening temperature is steadily normal, give cereals and sterile cream with the first and fifth meals, and if well borne, add to the midday meal gradually, first starchy vegetables, milk puddings, green vegetables, then eggs, white meats and finally red meats. This is the dietary advocated by Dr. Coit for feeding children from 12 months to 2 years of age who are suffering with fever. It is a very accurate and simple way in which to manage the diet.

Methylene Blue in Malaria.

Moore, in *Therapeutic Gazette*, gives the following conclusions as the result of his study of the use of methylene blue in malaria:—

(1) Methylene blue will destroy malarial parasites in many cases, but is less certain than quinine.

(2) Methylene blue is probably most valuable in chronic cases, but has no advantage over quinine.

(3) The effects of methylene blue are ordinarily more unpleasant than quinine.

(4) It is useful in cases that cannot take quinine on account of some idiosyncrasy to it. Its use in cases of pregnancy is undetermined.

(5) It is probably valuable in the treatment of hæmaturic and hæmoglobinuric fevers, on account of diuretic action. This has yet to be determined. We have had no chance to test its use in such cases.

(6) We believe quinine is quicker and much more certain, and would rather rely on it than on the methylene blue. Where there is a known idiosyncrasy to quinine, methylene blue, medicinally pure, should be given in doses of 3 to 5 grains every four to six hours in capsules, combined with ½ gr. pure nutmeg. Ordinarily there will be no unpleasant features, but in some cases there is burning on micturition, and now and then nausea and headache. In neuralgia and neuritis of malarial origin, methylene blue is very valuable. — *Journal Amer. Med. Assoc.*, July 2nd, 1904.

Plague.

Lloyd, B. J. "The Rat and his Parasites, with special reference to Bubonic Plague."—*California State Journal of Medicine*, 1904, June.

Sea-Snake Venom.

Sir Thomas Fraser and Major Elliot, I.M.S., in a recent communication to the Royal Society on the physiological action of the sea-snake venom, report that sea-snake (Enhydrina) venom: (1) Had practically no effect on the walls of arterioles; (2) no direct action on the vagal cardio-inhibitory centre of the mammalian heart exposed *in situ;* (3) it has an important action on the respiratory mechanism when given in lethal cases, causing respiration to fall rapidly and a rise in blood pressure, to be succeeded by a slower heart beat and a fall in blood pressure. It is evident that the respiratory centre is acted upon directly; (4) a motor nerve-end paresis is also produced which no doubt serves to explain its virulent toxic effects.

Snake Poison.

Elliot, R. H. "A Contribution to the Study of the Action of Indian Cobra Poison." Presented to the Royal Society, January 18, 1904.—The summary of conclusions arrived at by Major Elliot, who is at present engaged on snake venom research under the orders of the Secretary of State for India, are: (1) Cobra venom acts directly on the muscular tissue of the blood-vessels, or through their vasomotor nerve endings, constricting the arterioles, and thus raising the arterial blood pressure; (2) cobra venom also acts directly on the isolated frog ventricle, killing it in a position of firm systole, if the solution be concentrated; (3) cobra venom affects the isolated mammalian heart when solutions of it are perfused through the coronary circulation; (4) when given subcutaneously in low lethal doses, cobra venom kills by paralysing the respiratory centre; (5) cobra venom, when given in low lethal doses subcutaneously raises the general blood-pressure; (6) cobra venom when injected in large doses, and especially when given intravenously, causes (*a*) a sudden fall of blood-pressure, (*b*) a subsequent rise, provided the dose has not been too large, and (*c*) a final fall.

Kyls, P. Cobra-poison and Antitoxin. *Berliner klin. Wochenschrift*, vol. xli., No 19.

Colonial Appointments.

Dr. E. N. de Vere Dawson has been appointed Additional District Surgeon of Kimberley, Cape Colony, resident at Warrenton.

Dr. H. W. P. Lyster Jameson, who has been connected with the Department of Education in Natal for some time, has been appointed an Inspector of Schools in that colony.

Dr. C. A. Kitching has been selected for the office of District Surgeon at Mossel Bay, Cape Colony.

EXCHANGES.

Annali di Medicina Navale. Annali d' Igiene Sperimentale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Medical Gazette. Indian Medical Record. Interstate Medical Journal. Janus. Journal of the Royal Army Medical Corps. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico - Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Transactions of the American Microscopical Society. Treatment.

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Original Communications.

HAVE ANKYLOSTOMIASIS PATIENTS ANY PECULIAR MARKING ON THEIR TONGUES?

By F. M. Sandwith.

Lecturer at the London School of Tropical Medicine; Consulting Physician to Kasr-el-Ainy Hospital, Cairo.

In this Journal, under the dates of June 16th and November 1st, 1902, Mr. P. H. Delamere, of Leguan, British Guiana, drew attention to a peculiar marking of the tongue in his ankylostomiasis patients, "exactly as if the patient had just wiped a penful of Stephens's blue-black ink on his tongue." He believes this marking is diagnostic of ankylostomiasis, and that the patches gradually fade away from the tongue after appropriate treatment of the patient with thymol and iron. The same observer contributed a paper on this subject to the *British Guiana Medical Annual* for 1902.

On September 1st, 1902, Mr. Duprey, of St. Lucia, wrote to this Journal to point out that this marking of the tongue is unknown among native children and youths in the West Indies suffering from ankylostomiasis, though it is quite common among immigrant coolies there of nearly all ages. He suggested that the staining is due to the coolies' habit of chewing leaves of the "Phan" plant, and this may very well be the case.

I have been for years familiar with brown or black patches of pigment on the tongues of some coloured patients, and they are of great interest to students and visitors who see them for the first time. But after an experience of more than one thousand tongues of ankylostomiasis patients, I had received the impression that pigmented patches were no more frequent in these patients than in other hospital cases. However, it seemed to me obvious that this special point ought to be investigated, for if it were true, as suggested, that ankylostomiasis could be diagnosed by these patches, it would be an observation of great value to those obliged to deal with that disease without the aid of a microscope.

I therefore examined 100 in-patients in whose fæces ankylostoma eggs had been found, but only 11 had any patches of pigment on the tongue, though 53, or more than half of them, had distinct colouring of pigment in the sclerotic of their eyes. I then examined 100 other patients in the wards in whom no trace of ankylostomiasis could be discovered: 7 of these had pigmented patches on the tongue, and 27 of them had evident pigment in the sclerotic. This eye pigment varied from "very little" to "very marked," and is sufficient to show that I was really examining dark-skinned patients. As a matter of fact the individuals examined varied from the *café-au-lait* coloured Egyptian to every shade of brown Nubian and black Soudanese. I took the cases who happened to be in hospital without exercising any choice; they were all adults, and very nearly all were men.

I am now prepared to state that in Egypt at least the marks on the tongue have no reference to the stage of anæmia, and the observation is of no value for diagnostic purposes.

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THE

Journal of Tropical Medicine

August 15, 1904.

British Medical Association.

ABSTRACT OF THE PROCEEDINGS OF THE SECTION OF TROPICAL DISEASES.

First Day, Wednesday, July 27, 1904.

Address on the Fallacy of Finality.

By Alexander Crombie, C.B., M.D.

Abstract.

Gentlemen,—In my presidential address when opening the Section of Medicine and Pathology at the Indian Medical Congress of 1894, I selected "*Indian Fevers*" as the subject of my remarks, and I wish to refer to some of the opinions expressed on that occasion, and some of the criticisms of which they have been the object.

The criticisms of clinicians have on the whole been favourable to the belief in the *occurrence in hot climates of fevers of a continued type other than typhoid and malarial remittents, but the opinions of our laboratory confrères have been almost uncompromisingly opposed to it.*

I will first allude to my contention that notwithstanding official returns to the contrary which show an overwhelming majority of admissions for malarial fevers, "ague" is not the most prevalent type of fever in any of the parts of India where I practised my profession. The commonest type of fever is what

I have elsewhere called a "single-paroxysm fever." The paroxysm may be of a few hours' or a few days' duration, but it is a single paroxysm, and has no tendency to recur. If it lasts a few hours it is called "ephemeral fever," if a day or two it is called "febricula," if several days it is known as "simple continued fever."

These attacks of fever give no clinical evidence of periodicity. I failed to find the malarial parasite in such cases, and they all recovered without quinine. But these cases of a single pyrexial paroxysm have, nevertheless, been by many regarded as essentially malarial in their nature. Rogers says they are all malarial, as shown by a microscopical examination of the blood and an analysis of the symptoms. But he does not say that he found the malarial parasite present in any of his cases. Neither is the fact that they each recovered after quinine evidence that they were malarial in nature, because they are essentially fevers of a single pyrexial paroxysm and recover equally well without quinine as with it. There remains the one evidence of the mononuclear increase; but as this can no longer, I think, be held to be conclusive of recent malarial infection, nothing remains to support the contention that these cases of fever of a single paroxysm are all of a malarial nature.

Quite recently James wrote as follows:[1] "It is certain that other fevers than malaria are often returned under the term 'ague.' In order to ascertain what proportion of the admissions were really due to malaria, a number of men admitted for this disease were examined in October, 1901, by Dr. Christophers" (*i.e.*, in Mian Mir, the most malarious cantonment in India, and at the most malarious season) "and in 40 per cent. of these malarial parasites were found. In the same way I examined a number of men admitted or detained for ague during September, 1902, before any quinine had been administered to them, and found malarial parasites in 45 per cent. of the cases examined. During this month also, through the courtesy of Major Gordon Hall, R.A.M.C., no quinine was administered as medicine to a number of cases in which I had not found parasites. All of them recovered in from one to three days, without any quinine treatment, and from this and the fact that several examinations in each case failed to show the presence of parasites, I conclude that these cases of fever were not due to malaria, though usually entered as such in the returns."

Similarly, writing in Bombay in February, 1904, Mr. Arthur Powell bears testimony to the same effect.[2] Thus he says: "Slight fever, for which no specific cause has been detected by me, is not uncommon in Europeans who have been a short time in the country. I have failed to find any malarial parasites in many such cases, and to test the theory that these are malaria, with a sparse infection, I have withheld quinine to see if a relapse would occur—no such recurrence has taken place."

We must, I think, therefore conclude that a large proportion of the febrile attacks of hot climates must still be included in the terms, "febricula" and "simple continued fevers," and that the evidence that they are all malarial is inadmissible.

Non-Malarial Remittent.

I pass next to the consideration of a form of fever which I called "non-malarial remittent." This is a fever of considerable severity, duration and mortality, lasting on an average six weeks, if not fatal at an earlier period. I was never able to find malarial parasites in such cases, and quinine sometimes pushed to the extreme dosage of 90 grains a day (6 grammes), was not only ineffectual but obviously harmful. The late Dr. Hughes and Dr. Edmondston Charles contended that this "non-malarial remittent" was in reality Mediterranean fever. I confess that my confidence was somewhat shaken when it was announced that the sedimentation test for Malta fever had been successfully applied to cases of fever from Dugshai and elsewhere in Northern India, from Calcutta, and from Assam, and that, in fact, kala-azar was epidemic Malta fever. I am glad to find that Rogers, as the result of his observations, agrees with me that Malta fever does not exist, or only rarely, in Lower Bengal; and that kala-azar, which Rogers thought was a contagious form of malarial fever, is now shown to be a form of "non-malarial remittent" associated with the Leishman bodies.

My object is to point out the fallacies which lie in the way of investigators, and turn them aside from the path, on which some of them set out with a clear object in view, and which would, if pursued with more imagination and stricter logic, have surely led them to the discovery of the existence of this class of fevers which can no longer be denied, although hitherto recognised chiefly under the name of "malarial cachexia."

The fallacy I chiefly wish to allude to is the fallacy of finality, the fallacy that every step made in advance is final, and that every fact of medicine must be brought into line with it for the reason that there is nothing beyond. It is a fallacy which has marred the progress of medicine ever since it started on its journey. When Jenner showed that the "typhoid" fever of the English, the abdominal typhus of the Continent, was a distinct pathological and clinical entity, it was thought this step was final; every fever that was not malarial must be either typhus or enteric, and Mediterranean fever had to be included in one or other of these categories, and we accordingly find even Laveran, in the early editions of his great work on "Paludisme" classifying it in this way, notwithstanding its striking divergence clinically from either malarial or typhoid fevers. Then came Bruce, to show us that it was as distinct bacteriologically as it was clinically and pathologically from either.

At last we had got to the end of everything and every fever that was not malarial or typhoid was Malta fever, and in proof of this opinion came reports of serum tests from Upper India and Assam, entirely corroborative of it, and it was clinched by the discovery of the clinical significance of the leucocyte count.

Rogers was the great apostle of the leucocyte count, and his whole argument in the paper he read last year

[1] Royal Society, Reports of Malarial Committee, October 10th, 1903.

[2] *Indian Medical Gazette*, February, 1904.

was based on the opinion that "by this means alone, in the great majority of cases, a correct diagnosis can be arrived at by the examination of stained blood-films with an ordinary high power lens." I am far from disparaging the value of this method of investigation, but an increased percentage of mononuclears has been found in the spotted fever of the Rocky Mountains, in the fever of trypanosomiasis, in blackwater fever, and in that associated with Leishman's bodies. It has, indeed, been abandoned by Rogers himself, for in a recent communication he says that "if the new bodies are not a form of malarial organism, then it is evident that a large mononuclear increase is not diagnostic of malaria, but rather an indication of the presence of a protozoal as opposed to a bacterial invasion of the system," and his whole argument as to the non-existence of a "non-malarial remittent" fever crumbles before his own breath.

Is Non-Malarial Remittent, Typhoid?

It may seem hypercritical to apply similar reasoning to the arguments which have been brought forward to prove that this so-called "non-malarial remittent" is nothing more than typhoid. I require something more than an increased percentage of lymphocytes, or even the Widal reaction, to convince me that enteric is a common fever among natives of Lower Bengal. It has yet to be proved that typhoid is the only fever in which an increased lymphocyte percentage occurs, and until that is done, all argument founded on that assumption is a mere begging of the question, irrespective of Rogers' admission that it was absent in one-third of the cases so diagnosed by him. I must also demur to accepting a positive Widal reaction as conclusive of active typhoidal infection in any given case of fever in a native of Bengal. As with the mononuclear increase in malarial or rather protozoal infection, so the phenomenon of agglutination may occur under other conditions and is often of long and indefinite duration. Though it is lost, as a rule, in a few months after an attack of typhoid, it may persist for twenty-five years, according to Horton Smith, so that any case of fever occurring within an indefinite period after recovery from this fever may give the reaction, without any fresh infection by the bacillus of Eberth having occurred. It is even an unjustifiable assumption that a previous attack of typhoid fever is necessary for the manifestation of the reaction in natives of Lower Bengal, who give no history of any fever which could be regarded as having been typhoidal.

This is a point on which Freyer, of the R.A.M.C., was the first to sound a warning note. I am also aware of the negative results obtained by Lamb, of Bombay, who used the sedimentation test, but I think it desirable to put on record those which I obtained in examining the blood of healthy natives of India living in London.

None of these young men had a history which could be regarded as indicating recent typhoid fever and yet there were present in their blood substances which are regarded in ordinary laboratory work as indicative of present or recent typhoid infection, and I think we must therefore accept with reserve the opinion formed on the serum reaction alone, that typhoid fever is a common form of fever in natives of Lower Bengal, in the face of these results and the experience of many medical officers who have regarded it as rare, an experience grounded not only on clinical observation, but on *post-mortem* examination. We have it on record that one of Rogers' predecessors in the appointment of Pathologist to the Medical College Hospital, Calcutta, did not see the ulceration of the intestines which is pathognomonic of enteric fever in a native of Lower Bengal during the ten years of his tenure of office, and the absence of confirmation of his opinion by *post-mortem* examination is a serious omission in Dr. Rogers' paper.

In my address of 1894 I spoke of a continued fever, which ran the course of a mild typhoid, of from three to four weeks' duration, but which had none of the clinical symptoms of that disease. It had been recognised as a peculiar type in all the larger towns in India, where it was known by the local names of "Calcutta fever," "Bombay fever," &c. In the absence of specific evidence that it was no other than typhoid, we declined to give it this name, although we treated it as such. I provisionally called it "urban fever" in 1894, but am now prepared to regard it as a peculiar form of typhoid and in my paper in the "Encyclopædia Medica" I have suggested the alternative name of "bastard typhoid." My reasons for advancing it to this category are that in one case which I had an opportunity of examining before I left Calcutta I obtained the Widal reaction, and as this is a fever of Europeans, the same objection does not exist to accepting this evidence as it does in the case of natives. Rogers also states that he found this reaction in every case of continued fever in the wards of the European General Hospital. It would have been more satisfactory if he had sorted the cases clinically, so as to have been able to make it quite clear that his enumeration included cases of this type, for the fact that they conform to the serum reaction of typhoid fever in no way alters the fact that they exist as a distinct clinical type. It has been demonstrated that there are several types of enteric fever, and a form which does not give the serum reaction in any period of its course has been pointed out under the name of "paratyphoid." And I think that the distinct clinical type which is so well recognised in India, and which I have called "bastard typhoid," ought not to be dismissed because it gives the serum reaction, but its peculiar clinical features rather mark it for more exact research. My experience in connection with the typhoid fever of the South African War, which showed several very distinct deviations from the ordinary classical enteric of the text-books—namely, the often copious eruption, the frequency of thrombosis and of muco-enteritis as a sequela, has led me to think that typhoid fever is generally a mixed infection, the symptoms and severity varying with the amount and quality of the mixture, and it is not impossible that the peculiar type which occurs in the large cities of India may turn out to be a pure infection with Eberth's bacillus, and may thus form the bedrock on which the more classical cases are built up by additions of other intestinal flora.

Trypanosomiasis.

By Col. David Bruce, F.R.S.
Royal Army Medical Corps.

After referring to the advance of our knowledge concerning trypanosomiasis during the past twelve months as remarkable, Col. Bruce analysed our knowledge of the subject as follows:—

(1) At present we consider that the *Trypanosoma Gambiense* (Dutton), found in the blood of natives of West Africa, and the trypanosome found in sleeping sickness are identical.

(2) It would appear also that the so-called trypanosoma fever is nothing but the first stage of sleeping sickness. In Uganda the cases which, twelve months ago, had trypanosomes in their blood and were apparently healthy now show decided symptoms of sleeping sickness.

(3) Neither the Native nor the European are immune from this disease. At one time Europeans were considered to be immune to sleeping sickness, but this is now known to be incorrect.

(4) The mortality of sleeping sickness is 100 per cent., and although many natives in whose blood trypanosomes were found seem to kill off the parasites before the disease has advanced to sleeping sickness, still it is doubtful if such is really the case. The incubation period may be prolonged, but it seems inevitable that the infected person dies of the infection.

(5) No evidence has been brought forward to show that any of the lower animals take any important part in the spread of human trypanosomiasis. The suggestions that the trypanosomes live in the blood of freshwater fish in the Victoria Nyanza and the Crocodile, and that their parasites are conveyed by blood-sucking insects to man, are ridiculous speculations.

(6) Human trypanosomiasis is conveyed from the sick to the healthy by means of a biting fly—the *Glossina palpalis*. Although this method of infection has not been proved by observers on the West Coast of Africa, still the evidence obtained in Uganda would seem to amount to complete proof; the distribution of sleeping sickness and this fly appearing to be identical.

(7) As several members of the genus *Glossina* have been proved to be capable of carrying the parasite from the sick to the healthy, there is a danger that sleeping sickness may spread into the British East African and other tsetse-fly regions. Dr. Wiggins' researches and those of Greig and Gray would seem to prove this possibility.

(8) No other genera of biting flies seem capable of carrying the disease. Neither the *Stomoxys* nor *Tabanus* seem capable of transmitting the disease, although they are amongst the most virulent of biting flies. There is some evidence, however, to show that *Tabanus* can carry the trypanosome of surra (Capt. Rogers).

(9) The *Trypanosoma Gambiense* does not appear to pass through any metamorphosis in the *Glossina palpalis*. The transference of the parasite by this fly from one animal to another is mostly mechanical. In favour of this belief it is found that the fly is not able to retain its infective quality for more than forty-eight hours. No metamorphosis has ever been observed in the body or secretion of the tsetse-flies examined. Against the doctrine of no metamorphosis we have, however, the recent work by Schaudinn on halteridium, but the changes he describes are very different from those which we know of in the case of the malarial parasite.

(10) All the stages of development of the *Trypanosoma Gambiense* takes place in the human host; in other words, the trypanosome does not absolutely depend upon the intermediate host for its continuance

(11) In regard to prophylaxis, the movement of Natives from sleeping sickness areas to other parts where tsetse-flies abound should be prevented; and healthy Natives should be prevented taking up their abode or travelling in sleeping sickness districts. When possible, infected areas ought to be evacuated and the breeding places of tsetse-flies destroyed.

Remarks on Trypanosomiasis.

By David Nabarro, M.D.Lond.
Lecturer on Bacteriology, University College, London; Member of the Royal Society Commission to Uganda, 1903.

Experiments made in Uganda in conjunction with Capt. Greig showed that monkeys inoculated against the blood and the cerebro-spinal fluid trypanosoma were rendered immune against the blood and the cerebro-spinal fluid trypanosoma respectively, but not against the animal trypanosomata met with in Uganda.

Respecting the statement that "trypanosoma fever" is the first stage of sleeping sickness, it is doubtful if this can be stated with certainty.

Up to the present no evidence has been brought forward to show that any of the lower animals take any part in the spread of human trypanosomiasis. Regarding a previous communication by Col. Bruce, that several of the lower animals are susceptible to sleeping sickness by artificial inoculation, it would appear to be a very debateable point. Certainly several monkeys treated experimentally died after being inoculated with blood of sleeping sickness trypanosomes; but the brains of several monkeys examined did not show the typical naked-eye changes seen in sleeping sickness, nor any trace of the perivascular lymphocytic infiltration which is so prominent a feature in the human sleeping sickness brain. This negative evidence, however, cannot be considered an insuperable objection to the theory that trypanosoma is the cause of sleeping sickness, for the same thing is found in correlated domains of pathology. Although the *Glossina palpalis* is the principal carrier of infection in trypanosomiasis, other species of *Glossina* also serve, but no other kind of known biting fly has been found which has the power of transmitting the disease.

Human Trypanosomiasis and its Relation to Congo Sleeping Sickness.

By Cuthbert Christy, M.B.Edin., J. Everitt Dutton, M.B.Vict., and John L. Todd, M.D.McGill.

The information conveyed in this paper was part of the second Progress Report of the expedition of the Liverpool School of Tropical Medicine to the Congo in 1903. The investigations were for the most part carried on at Leopoldville, and out of a total of 465 Natives examined there from various parts of the Upper Congo, 54 were found with trypanosomes in

their blood. At Boma, Matadi, and the cataract region of the Lower Congo, 70 were examined, and 49 were found infected. In the British colony of Gambia, of 1,043 natives examined only 6 were found with trypanosomes in their blood.

For descriptive purposes the cases met with were divided into three main groups, although no sharp line of demarcation could be drawn between them: (*a*) Cases with no definite symptoms of illness; (*b*) cases with few symptoms of illness; (*c*) fatal cases showing well-marked symptoms—sub-divided into (1) cases showing no sleep symptoms, and (2) cases showing sleeping symptoms. The deep sleep, continued sleep, or lethargy, has been, perhaps, made too much of in the descriptions of the disease, as in the Congo district they played almost a secondary part in the clinical symptoms of the illness.

In the Congo an epidemic of sleeping sickness has not been met with by the authors, although at least one epidemic has been placed on record. The Congo cases seem to bear a close resemblance to the cases described as occurring in Uganda towards the end of the epidemic in that country.

The Course of the Disease.—Accurate data of the duration of the latent stage of the disease are not available, but counting from the recognition of obvious signs of ill-health, two to four months would appear to be the duration of the disease itself. Recovery has never been recorded in the case of a Native, but in the case of a European, a missionary lady who suffered from trypanosomes in the blood, they would appear to have disappeared.

Death does not seem to be produced by trypanosomes alone. Secondary bacterial infections seem to determine the fatal issue in many cases of Congo sleeping sickness. Out of 22 necropsies, 13 showed complications and obvious secondary infections. They were: purulent meningitis, 4; purulent pleurisy and pneumonia, 1; pneumonia and localised tubercle of lung, 1; localised gangrene of lung, 1; enlarged caseating and breaking down of glands in thorax and abdomen, 2; dysenteric ulceration of large bowel (perforation in one case), 2; universally adherent pericardium (recent), 1; infiltration of pus in femoral, inguinal and intestinal iliac glands (gonorrhœa), 1. In Uganda and the Congo purulent meningitis has been the most frequent complication. In all such cases an almost pure culture of diplococcus occuring in small chains was found.

The periodicity and frequency of occurrence in the peripheral blood proved interesting, inasmuch as parasites may be absent from the peripheral blood for varying periods. The severity of the symptoms is not affected by the presence or absence of the parasite from the peripheral blood; and it was noted that the parasite in some cases disappeared from the blood for several days before death.

Experiments upon Animals showed that human trypanosomes taken from cases of the disease in the early and late phases of the disease were capable of infecting rats, mice, guinea-pigs, rabbits and monkeys. The period of incubation in these animals was: Rats, 5 to 20 days; mice, 5 to 16; guinea-pigs, 11 to 25; rabbits, 17 to 27. No animal inoculated with material taken from the bodies of persons dead of trypanosomiasis ever proved infectious. So far the experimental transmission of the disease by flies (*Glossinæ*) has not given definite results.

The Cerebro-Spinal Fluid in Sleeping Sickness (Trypanosomiasis): 104 Lumbar Punctures.

By Cuthbert Christy, M.B., C.M.Edin.

The full report of this paper will be found in the Thompson-Yates and Johnson Laboratory Reports of 1904, being a part of the second Progress Report of the Expedition from the Liverpool School of Tropical Medicine to the Congo in 1903.

The conclusions arrived at as the result of 104 lumbar punctures made in 64 cases of sleeping sickness are:—

(1) That in many cases the trypanosomes never find their way into the cerebro-spinal fluid.

(2) Commencement of fever or other symptoms is not correlated to the entrance of the parasites into the cerebro-spinal fluid.

(3) When a large number of trypanosomes occur in the cerebro-spinal fluid there is usually a rise in temperature.

(4) As in the blood so in the cerebro-spinal fluid, the parasites may come or go.

(5) Large numbers of the parasites may be found in the blood, but not in the cerebro-spinal fluid at all, and *vice-versa* to some extent.

(6) The white-celled elements of the cerebro-spinal fluid is apt to increase when trypanosomes are present in the blood.

(7) Mania and other cerebral symptoms are more likely to be marked when parasites enter the cerebro-spinal fluid early in the disease.

Discussion.

Sir Patrick Manson, K.C.M.G., F.R.S., remarked that if Col. Bruce's contention that *Trypanosoma Gambiense* is the cause of sleeping sickness be a scientific fact, it is a conclusion of the highest importance. The evidence, however, he has advanced is principally epidemiological, not pathological, and it applies to a very limited region. Quite recently, in a district adjacent to the southern end of the Victoria Nyanza, the entire population has been reported to be infected with trypanosomes, yet sleeping sickness is unknown there. If this be true, then the trypanosome cannot be regarded as a cause of sleeping sickness. Trypanosomes would seem to be an element in the causation of sleeping sickness; but the determining factor of the pathogenic condition causing the symptoms of sleeping sickness would seem to be bacterial; in fact, that a combination of Castellani's first and last etiological views is the correct one. Trypanosoma infection is not always fatal; he had seen a patient in whom, three years ago, all the clinical symptoms of trypanosomiasis were present, who was now quite well.

Louis Sambon, M.D., said he did not agree in the statement that the tsetse-fly was a mere mechanical carrier of the parasite of trypanosomiasis, and that all phases of life of the parasite take place in the human being. Were the *Glossina* a mere mechanical carrier of infection, how comes it that of the other biting parasites, such as the *Stomoxys* and *Tabanus*,

which were known to feed on patients with trypanosomiasis, none are capable of transmitting the disease?

A New Trematode of Man (*Amphistomum Watsoni*).

By H. F. Conyngham, L.R.C.P.I.
London School of Tropical Medicine.

In February, 1904, six curious trematodes were sent from Northern Nigeria by Dr. Watson to the London School of Tropical Medicine. The parasites were found in the small intestine of a Negro who had died of starvation and diarrhœa. The patient came from Allamawa, German West Africa, to Zola, North Nigeria. He was one of a gang of freed slaves, all of whom were in a pitiable condition. He suffered from diarrhœa, the stools being watery and of a bilious colour, but with no blood or mucus. In the stools were seen many reddish-yellow, translucent, gelatinous, oval bodies (the trematodes). At the *post-mortem* examination the duodenum and upper part of the jejunum were found full of the oval bodies, some of which were alive and adherent. The trematodes found were pear-shaped, flattened ventrally, and slightly indented posteriorly at the margin of the posterior sucker. The anterior sucker lies at the bottom of a terminal sulcus; the posterior sucker, subterminal and ventral, is of large size; the genital pore lies a quarter length of the parasite from the anterior end. The body cuticle shows transverse ridges, and best seen on ventral surface. The worms measure 8 mm. in length and 5 mm. across in breadth at widest part. The ova seen *in utero* were oval and measured 130μ by 75μ. The specimens of the parasite were examined by Professor Blanchard (Paris), who pronounces them a new species of Amphistome.

The Treatment of Snake-Bites.

By Capt. Leonard Rogers, M.D., M.R.C.P., I.M.S.
Acting Professor of Pathology, Medical College, Calcutta.

The poisonous snakes may be divided into two main divisions according to their physiological actions: (1) The Colubrine class, including the sea-snakes (*Hydroophidæ*), kill by their venom paralysing the respiratory centre, and to a less extent the motor end-plates of especially the phrenic nerves. The venom has also some feeble hæmolytic action and power of causing contraction of peripheral vessels. (2) The Viperine class, including the true vipers and the pit adders, causes by their venom marked changes in the blood, rendering it incoagulable and setting up hæmorrhage into the bowel and tissues of the body. The most serious and constant effect of the venom is a rapid failure of the circulation, due to paralysis of the central vaso-motor centre in the medulla and not to any direct effect on the heart.

Antivenin.—Seeing that snake poisons differ in their action, it is readily seen how Calmette's serum made mainly from cobra venom is only active against Colubrine snake poisons. In the viperine poisons and in the venom of snakes which possess both cobra and viper poisons Calmette's serum is useless. The injection of antivenin intravenously assumes the maximum effects of the dose, and by this method the serum should always be given.

It is plain, therefore, that whilst we have on the market a serum (supplied by Burroughs, Wellcome & Co.) which acts satisfactorily when employed against cobra poisoning, we have no antivenin serum suitable in viperine poisoning.

Treatment of Snake-bites by Permanganate of Potassium.—In experimenting with this drug the plan of procedure was (1) injection subcutaneously of cobra and viper venom into an animal's limb; (2) after from one-half minute to ten minutes a ligature was placed on the limb between the site of injection and the heart; (3) an incision was made over the site of injection and solid crystals of permanganate of potassium were rubbed into the spot with sterile salt solution. The treatment by permanganate of potassium promises excellent results. Messrs. Arnold and Sons supply an instrument devised by Sir Lauder Brunton for the application of this remedy.

Supplementary Notes on the Tsetse-Flies (Genus, *Glossina, Wiedermann*).

By Ernest E. Austen.
Zoological Department, British Museum.

Seven species of tsetse-flies have been hitherto recognised and described. A new species, constituting therefore, an eighth species, has been described only a few months ago by Dr. Emile Brumpt, from specimens obtained by Dr. Dearson on the River Shari and the shores of the Lake Chad. The new species, however, turns out to be the *Glossina tachinoides* (Westwood), which was described so long ago as 1850. A further study of additional specimens, especially of a long series of specimens obtained two months ago on the Benue River, Northern Nigeria, by Mr. W. F. Gowers, shows that *Glossina tachinoides* is in reality a distinct species, nearly related to the *Glossina pallidipes* (Austen), but distinguishable by the fact that the hind tarsi are either entirely dark, or, as in the female, are dark with the bases of the first three joints usually pale. Brumpt believes that *Trypanosoma Brucei*, the parasite of nagana or tsetse-fly disease in domestic animals, is carried by at least five of these species. The same author also states that he believes that sleeping sickness may also be transmitted by several species of tsetse-flies.

Revised Synopsis of the Species of *Glossina*.

1. Hind tarsi entirely dark, or at least all the joints more or less dark (in the ♀ of *Gl. tachinoides* the basal half of the first joint and the extreme bases of the following joints are usually pale) 2.
   Hind tarsi not entirely dark; last two joints alone dark, remainder pale .... 4.
2. Ground colour of abdomen ochraceous-buff, with interrupted dark-brown deep transverse bands, and sharply defined pale hind borders to the segments; a very conspicuous square or

oblong pale area in the centre of the second segment; small species, not exceeding 8 mm. in length (exclusive of proboscis), the males considerably smaller *Tachinoides*, Westw.

Abdomen not so marked, very dark or for the most part uniformly brown, hind borders of segments if lighter extremely narrow and cinereous; pale area in centre of second segment usually triangular, with the apex directed backwards and continued into a cinereous median stripe; larger species... 3.

3. Third joint of antennæ dusky brown to cinereous-black.................. *Palpalis*, Rob.-Desv.

Third joint of antennæ pale (orange-buff) .... *Pallicera*, Bigot.

4. Large species: length at least 11 mm. ($5\frac{1}{4}$ lin.), wing expanse (measured from tip to tip, when wings are set at right angles to body) at least 25 mm. ($11\frac{3}{4}$ lin.) 7.

Smaller species: length rarely reaching 11 mm. ($5\frac{1}{4}$ lin.), often considerably less; wing expanse not exceeding 25 mm. ($11\frac{3}{4}$ lin.).............................. 5.

5. Last two joints of front and middle tarsi with sharply defined dark brown or black tips .... 6.

Last two joints of front and middle tarsi without sharply-defined dark brown or black tips; front and middle tarsi entirely yellow, or last two joints of former faintly tipped with pale brown... *Pallidipes*, Austen.

6. Generally distinctly larger; head wider; front darker and narrower in both sexes, sides parallel in ♂; abdominal bands deeper, leaving hind margins of segments only narrowly pale; hypopygium in ♂ smaller, darker, and more hairy; tip of ♂ abdomen more thickly clothed laterally with short black hair, bristles on 6th segment finer and less prominent *Longipalpis*, Wied.

Usually smaller; head narrower; front paler and wider; eyes in ♂ as well as in ♀ distinctly converging towards vertex; abdominal bands less deep, pale hind margins of segments therefore deeper; hypopygium in ♂ larger, paler, somewhat more oval in outline, and clothed with fewer fine hairs; tip of ♂ abdomen less hairy laterally; bristles on 6th segment in ♂ stouter and more conspicuous.. *Morsitans*, Westw.

7. Dorsum of thorax with four sharply defined small dark brown oval spots, arranged in parallelogram, two in front of, and two behind, transverse suture; bulb at base of proboscis brown at the tip............................... *Longipennis*, Corti.

Dorsum of thorax without such spots, though with more or less distinct longitudinal stripes; bulb at base of proboscis not brown at the tip[1] .... *Fusca*, Walk.

[1] *N.B.*—The ordinary dark brown patch on each side of the bulb on its upper margin, which is often especially well-marked in West African specimens, must not be mistaken for a brown tip.

The Congo Floor Maggot.

By Cuthbert Christy, M.B., C.M.Edin., J. Everett Dalton, M.B.Vict., and J. L. Todd, M.D.McGill.

Under the name of the Congo Floor Maggot the authors describe a blood-sucking dipteric larva found in the Congo Free State. The information was published in the First Interim Report of the Expedition from the Liverpool School of Tropical Medicine to the Congo, 1903. The first specimens of the maggots seen were met with at Nkanga, in the cataract region of the Congo. The maggots were mostly found by digging with the point of a knife in the dust-like cracks of the mud floor of the native huts. Where people slept on beds or platforms raised from the ground the maggots were not so numerous as under the sleeping mats laid upon the floor. Many of the maggots were turned up from a depth of three inches or more. As many as fifty were obtainable from beneath a floor mat at times. The specimens found varied in size from 2 to 15 mm. in length.

This larva is widely distributed. The natives in different districts call it Mabinzu at Tchmubiri, Nchichi at Leopoldville, Ntunga at Wathen, Moidi at Matudi, and at Bangala, Kiso.

The larval maggot is semi-translucent, of a dirty white, acephalous and amphipneustic. It resembles, when adult, the larvæ of the bot-flies, and consists of eleven distinct segments. An intestinal canal, salivary gland, nervous system, and flat body have been made out. The urinary tubules are four in number, in pairs on either side of the intestine.

When ready to pupate the larva lies dormant upon the surface, changes in colour to a pinky brown, and later becomes a dark reddish or brownish-black, chitinous, segmented and oblong puparium. The larva feeds mainly at night, and blood, varying in colour from bright red to black, can often be seen in the alimentary canal.

The fly called by the natives Nkulu Mwanzi, almost the size of a blue-bottle fly, but of a light brown, smoky colour, is believed to be developed from the floor maggot. It is about 10 to 12 mm. in length. The flies were submitted to Mr. E. E. Austen, of the British Museum, who pronounced it to be the *Auchmeromyia luteola*, Fabr., belonging to the *Muscidæ* family. The fly itself is incapable of sucking blood.

Experiments are being conducted with the floor maggot with the special object of ascertaining whether it is in any way connected with the transmission of trypanosomata.

Second Day, Thursday, July 28.

The Prophylaxis of Malaria.

By J. W. W. Stephens, B.A., M.D.Camb.

Walter Myers Lecturer on Tropical Diseases, Liverpool University.

Even in the present state of our knowledge it is not uncommon still to attribute malaria to the presence of

water in which the mosquito breeds, rather than to the mosquito itself. It is necessary, therefore, to educate the public as to how the Anopheline becomes infected, *i.e.*, can convey malaria. The source of infection really lies in the fact that in the Tropics the Native, and especially the child population, carries malarial parasites in its blood, and that it does so often while presenting not the least sign of sickness. It is from the Native the malaria-bearing mosquito gets its parasites, and these it transmits, after the lapse of a certain time, to the European. It is in the outstations, in the mining camps, &c., not in the towns, where we find malaria exists in its most virulent form. Were this fact brought home clearly, many valuable European lives might be saved without waiting for that far-off, indefinite time, when malaria will be eradicated from amongst the Natives.

Malaria is a contagious disease, and a certain mosquito conveys the contagion. The mosquito belongs to the sub-family *Anophelinæ*, of which there exist about a hundred species; of this number we know the following twelve species are capable of carrying malaria infection: In Europe, the *Anopheles maculipennis* (mainly), *A. bifurcatus* (less concerned), *A. superpictus*, and *A. pseudopictus*, especially in some parts; in Africa, *Anopheles maculipennis* (Algeria), *A. costalis* and *A. funesta* (Tropical Africa), and *A. chandoyia;* in India, *Anopheles Listoni*, *A. calicifacies*, and *A. maculipalpis;* in North America, *A. maculipennis;* in West Indies, *A. albipes*. That all Anopheles do not carry malaria would seem certain; but how many more than the twelve species stated are concerned in the process is unknown. It is therefore not enough in reporting that "Anopheles were found," but it is essential to know what species of mosquito was present before determining any elaborate prophylactic measures. Nor do the Anopheles resemble each other in their breeding grounds. In India, careful observations were made by Dr. Christophers and the author to determine the breeding grounds of different species of Anopheles. It was found that *A. Rossii*, which does not transmit malaria, preferred for its breeding ground shallow pools or dirty puddles; on the other hand, *A. culicifacies* loves clear, fresh water, and the moving water and streams of rivers and canals. It is therefore useless to attack the breeding grounds of *A. Rossii*, thereby saving an immense amount of expense and time in clearing away this stagnant water.

There is therefore a great deal of work to be done in this direction in regard to the habits and breeding grounds of malaria-bearing and non-malarial mosquitoes, so that the useful may be distinguished from the unnecessary work in the process of eradicating malaria by mosquito destruction.

A further important factor to determine is the power of flight of the mosquito. Dr. Christophers and the author, from a careful study of the subject, came to the conclusion that the normal flight of the Anophelines was a matter of some hundred yards, and not many miles, as has been stated. In Freetown, the centre of the town was free from Anopheles, but half a mile away they were plentiful. The explanation is simple. We had plenty Stegomyia, but not Anopheles, because the Anopheles in question required clear streams to breed in, and therefore they were found only in the outskirts of the town, near the running water. In India similar conditions obtain, the mosquitoes, however, travelling a distance of about one mile.

Concerning methods of prophylaxis they are usually:—

(1) *Anti-larval.*—This is summed up in the word Drainage. It is unwise to substitute petrolage for drainage, except as a temporary makeshift. The only way of estimating the success of anti-malarial measures is to obtain the "endemic index," *i.e.*, estimating the percentage number of children at any particular age, say under 10 years, who have parasites *in their blood*. In the suburbs of Calcutta, by this means, it was shown that malaria was not endemic there, but in the Terai the malarial index reached 72 per cent. Cachexial fever, not malaria, fills the hospitals in Calcutta.

(2) *Quinine.*—Where anti-larval measures are impossible, owing to the fact that the larvæ breed in the rice swamps around any given village, quinine prophylaxis gives excellent results. Amongst Europeans in small settlements, quinine prophylaxis is also effective.

(3) *Segregation of Europeans.*—On general sanitary grounds there can be no doubt that were the Europeans to segregate themselves away from Native dwellings, it would be advisable, so far as the Europeans were concerned. Some, however, regard this mode of dealing with the question as unjust, impolitic, &c., and academical; apart, however, from sentimentality, segregation has much to recommend it.

In regard to results of anti-malarial methods, it is difficult to pronounce definitely. The Ismailia campaign was conducted against mosquitoes as a whole. The work of the mosquito brigades at Ismailia were devoted to treating cess-pits, &c., which are merely the breeding ground of such mosquitoes as the Stegomyia, a mosquito which does not spread malaria. It is not even announced what was the species of Anopheles present at Ismailia. The result, however, was satisfactory practically, although scientifically our knowledge was advanced but little. In regard to the Mian Mir experiment, it was selected because the cantonment was highly malarious, and because, owing to a very small rainfall, anti-malarial work appeared easy. The irrigation canals, however, in the area experimented upon, no doubt contributed to undo and render futile the steps taken. The work, however, was undertaken with preliminaries on a scientific basis, which should be taken as an example by future workers. The species of Anophelines were first determined, and the breeding ground of each species mapped out. The endemic index of the resident natives was determined every month with control observations whereby to standarise the findings. The causes of failure have been discussed by many critics, but the anti-malarial measures failed not owing to the presence of irrigation canals, but to the immigration from without of mosquitoes flying an inordinate distance.

The Success of Mosquito Destruction Operations.

By Capt. S. P. James, I.M.S., and Lieut. S. R. Christophers, I.M.S.

So many successes have been claimed for the result of mosquito destruction campaigns that it is only by looking more closely at the reports of operations that we realise how little justification there is in many cases for the assumption of success. The fact of success has been based either upon apparent lessening of the actual number of mosquitoes or upon a reduction in admission rates to hospitals. At Mian Mir, however, although every effort to be thorough was made, and the efforts at mosquito destruction were continued over two years, the results were poor and altogether out of proportion to the means employed. The result also upon the malaria prevalence consisted in, perhaps, the delay of the onset of the fever season from about the end of August to about the end of September. The want of success, compared with reputed successes in other parts of the world, can only be ascribable to the value of the arts used in estimating the reality of results achieved. In no part, however, yet reported upon, has an attempt been made to verify a reduction in the number of adult Anopheles, nor has a reduction in endemic malaria, as shown by the number of infected natives, ever been demonstrated.

At Mian Mir an attempt was made to show that destruction of Anopheles when sufficiently complete is of practical importance as a prophylactic measure. One great difficulty was that breeding places at considerable distances had to be dealt with if the mosquito destruction was to be efficient; and the failure to extend the work over an indefinitely wide area allowed of an infiltration of adult mosquitoes from beyond the limits of the area in which the work was conducted.

It is evident that anti-malarial work cannot be successful by blind schemes of drainage. The mere destruction of millions of larvæ, the sweeping away of breeding places around houses and barracks, mosquito brigade work in towns, and such like, have not been proved to be successful in diminishing malaria.

More rigid experiments are necessary before any scientific conclusion can be come to as to the efficacy of any anti-malarial attempts yet made.

The Anti-Malarial Experiment at Mian Mir, Punjab, India.

By Ronald Ross, C.B., F.R.S.

Professor of Tropical Medicine, University of Liverpool.

The object of the experiment undertaken at Mian Mir had for its object to demonstrate by test observations the utility of all anti-malarial measures, particularly the destruction of Anopheles larvæ. The results of these operations are supplied in detail in a report sent in by Capt. James, I.M.S., and Lieut. Christophers, I.M.S.

In criticising this report the omissions are first to be noted. There is no date to the report, no table of contents, no index, no map of the surrounding country, no statement of the population of Mian Mir, nor of the exact area of operations.

The organisation of the endeavour seems defective, and the assistance afforded the officer in charge quite inadequate. The cost of the undertaking appears so small, relatively to work of the kind done elsewhere, that it would seem as though the attempt had been rendered altogether abortive by want of funds at the disposal of the observers. The total cost during two years' work seems to have been about £521. Now although Ismailia was altogether a smaller and an apparently easier place to deal with than Mian Mir, the cost was £5,000 during the first year alone. In Lagos the cost is about £10,000 per annum, in Klang and Port Swettenham £3,225 and £8,600 for the first year's work respectively, and Logan Taylor spent £1,000 for a preliminary draining of the waste puddles of Freetown.

In regard to the description of the nature of the operations followed at Mian Mir, much is left untold and evidently undone. Instead of using oil freely as has been done everywhere else, Christophers adopted the plan of baling the puddles, because it was feared the oil would spoil the crops, a quite unjustifiable precaution. It is true, however, oiling the water in the canal was adopted later.

The test employed by James and Christophers at Mian Mir, whereby to estimate their success in destroying mosquitoes, consisted merely in the personal opinions of each. This method cannot be so reliable as a conclusion arrived at by the general consensus of opinion.

The test for malarial reduction is a difficult one, even when a so seemingly exact method as microscopic examination of the blood of native children for parasites is relied upon. If 100 examinations under similar conditions in three consecutive days are made, it is almost certain that different percentages of infection on each day will be found and the differences may be large and altogether apart from the influence of mosquitoes; the apparent percentage of infection probably varies largely from season to season. It is further unlikely that, even supposing a neighbourhood were freed from mosquitoes, it is doubtful whether a marked reduction in cases of malarial fever would show itself for months without the use of quinine. The anti-mosquito work seems to have had the startling effect of increasing the numbers of mosquitoes in the houses at Mian Mir.

The only explanation of this curious fact must be that there must have been a compensating influx of mosquitoes from the adjacent districts. The lessons we learn from the experiments at Mian Mir and several other places are that we have much yet to learn as regards (1) the radius of operations required to reduce the density of a given species of mosquito to a given percentage; and (2) the percentage of mosquito-reduction required in order to obtain ultimately a given percentage of malaria reduction.

Notes on the Prophylaxis of Malaria.

By Henry Strachan, C.M.G.

Principal Medical Officer of Lagos, West Africa.

The prophylaxis of malaria, so far as the individual is concerned, resolves itself into the apparently simple rule, "Do not allow yourself to be bitten by mos-

quitoes." To destroy adult mosquitoes in any given locality would necessitate an expenditure in time and money totally impossible to be met. Hopes are centred therefore upon destruction of all possible breeding places and of the larvæ of mosquitoes. The steps taken to accomplish this end are well known, and have been put in practice with advantage in several towns and villages of West Africa with benefit. To protect the individual from mosquito bites, mosquito-proof rooms are an important element, but owing to the difficulty of keeping the rooms so protected cool, the practical value is very little.

Malaria ought to be dealt with as are other infectious ailments, and the individual infected should be isolated until recovery is pronounced.

Quinine prophylaxis is no doubt useful, but some individuals seem to be attacked in spite of regular quinine taking. When quinine cannot be taken without causing constitutional troubles "Thiocol" would seem to be an efficient substitute. When travelling in the Bush a large umbrella of waterproof canvas with cane ribs and bamboo support, made by Mr. Benjamin Edgington, at Dr. Strachan's suggestion, is convenient and efficient.

In places where success in the elimination of malaria seems impossible the only alternative would seem to be removal of the town to a new site.

The segregation of Europeans in a separate area of the town, away from native dwellings, is likely to prove futile unless efforts are also made to improve the condition of the Natives and their quarters, which is the real infecting agent.

The attempts to eliminate or reduce malaria in Lagos Town, conducted ever since 1898, would seem to have been successful in some degree; thus in 1899 the cases of malaria numbered 1,894, and the deaths 624; whereas in 1903 the cases of malaria numbered 970 and the deaths 427. Anti-mosquito measures and the administration of quinine as a prophylactic were the measures adopted during the years in question, and their application seems to have afforded beneficial results.

The Prophylaxis of Malaria.

By Andrew Duncan, M.D., B.S.Lond.

Physician Seamen's Hospital Society; Lecturer on Tropical Medicine, London School of Tropical Medicine.

Malarial fevers have been the cause of a serious and extensive disablement in many of the military expeditions in tropical countries where malaria is rife. In campaigns many questions of detail have to be thought of if the soldiers are to remain fit. In selecting men for the work of a campaign in a tropical country it must be remembered (1) that previous attacks of malaria render men liable to recurrent attacks; (2) young soldiers suffer more than older men; (3) Negroes suffer less than other men from malaria; (4) the end of the hot season predisposes to malaria; (5) flannel should be worn; (6) marching in the early morning hours is less likely to be followed by untoward results than at any other period of the day; (7) camps should, when possible, be pitched on high ground; (8) food should be sufficient, and monotony in diet prevented; (9) sleeping on the ground is a provocative of fever. Malarial fever may be prevented in three ways: (1) By malarial protection against the infected mosquitoes; (2) by destruction of the infected mosquitoes; (3) by prophylactic drugs. When an army is on the march the last-named is the only available method of prevention, and although there is some evidence against the efficacy of quinine prophylaxis attempted during campaigns, there is an overwhelming testimony in its favour.

Discussion.

Col. Kenneth Macleod remarked that although much had been said about the life of the mosquito, the food of larvæ was not referred to, nor were the transference of mosquitoes by railways and ships alluded to. A potent means of mosquito destruction is to be sought for in the use of the broom in sweeping away dust and mosquitoes from the dark corners of rooms, especially during the day-time. The attempt to eliminate mosquitoes and malaria from Mian Mir was undertaken under conditions of great complexity and difficulty. The fact of irrigation being necessary for the growth of crops in India had a very deterrent effect upon the success of all known mosquito destruction methods; but irrigation must remain a constant and necessary part of agriculture in India and many other countries, and to abolish it would mean famine.

Major G. H. Fink, I.M.S. (retired): Although the experiments at Main Mir and many of the contentions in Dr. Stephens' paper would seem to gainsay Major Ross's work, it must be remembered that there may be a difference in the characters of the infection in different places; blood parasites with apparently different structures, even amounting to so vital a body as the nucleus, cause seemingly similar results. Whence malaria comes remains a mystery. Plehn's bodies would appear to be present in the blood before malarial symptoms declare themselves. The parasite may be both male and female, existing, as it were, on the borderland between animal and vegetable, and then develope in the mosquito. As regards prophylaxis, in Assam an emulsion made of peppermint oil, castor oil, and liq. potassæ poured into the stream around a dwelling seemed to be effective in causing destruction of mosquitoes.

P. O. Malabre, M.D., said the natural enemies of mosquitoes, both of the adult and larval forms, would appear to be an important element in dealing with the subject of mosquito destruction. The dragonfly was stated to be a virulent enemy of the mosquito, but confirmation of the statement was wanting. Smoke in any form also seemed to kill off the mosquitoes in a room or dwelling.

Fritz J. A. Beringer, M.R.C.S., L.R.C.P., Colonial Service, Gold Coast, said, whilst in Hong Kong on duty with the troops there during 1900-1902, systematic quinine prophylaxis was tried with disappointing results upon the British soldiers. Five grains quinine in solution were given at morning parade during the fever season, and later 10 grains daily for three consecutive days per week, yet there was no apparent beneficial prophylactic effect noticeable. In the majority of cases clinical evidence alone was accepted as evidence, but in many cases the malarial parasite was found in the blood.

D. E. Anderson, M.D.Paris, said smoke would seem to be a favourite method of destroying mosquitoes in Madagascar as well as in other countries, notably the Riviera. The smoke does not kill but partially paralyses the insects, allowing them to be swept away with brooms. It is well known that until 1867 there was no malaria in Mauritius. What happened at the time, whether the Anopheles were introduced or whether Anopheles were there before, and malarial cases imported from India supplied the link in the chain, is not, and probably never will now, be known. It is, however, certain that sporadic cases of malaria occurred in Mauritius before 1867.

Capt. C. E. Williams, I.M.S., said that dragon-flies prey upon mosquitoes, and it has been said that in some parts of the Tropics dragon-flies are kept in the rooms to reduce the number of mosquitoes. In other parts it is related that when dragon-flies appear mosquitoes disappear, and *vice versâ*. Dragon-flies raised in captivity from the larvæ by Capt. Williams were fed on living mosquitoes, and when they began to fly they seized and fed on mosquitoes readily. Various species of Mantis feed on mosquitoes.

Sir Patrick Manson, K.C.M.G., F.R.S., questioned the diagnosis of malaria in the case of the soldiers in Hong Kong mentioned by Mr. Beringer, as not profiting by quinine proplylaxis. Hitherto many places in the Tropics have remained free from malaria, although all the conditions seemed favourable for its development. Mauritius, at one time free within our memory, is now an endemic centre of malaria, and seeing the possibility of infection, it would be well were uninfected places to consider what precautions should be taken against such a contingency.

W. J. Simpson, M.D., F.R.C.P., Professor of Hygiene, King's College, London, Lecturer in Tropical Hygiene, London School of Tropical Medicine, regretted that the experiment against malaria was made in the way it had been at Mian Mir. To deal with a small portion of a cantonment was unsatisfactory. The organisation seemed also defective in numbers. The same fault seems about to be perpetuated in the Central Provinces, where the civil surgeons in five municipalities are directed to carry out a campaign against mosquitoes. Knowing the work that a civil surgeon in India has to do, it is impossible for him to carry out the mosquito destruction crusade without neglecting other duties. It was hoped the order would be rescinded, as nothing but failure could result. India required a proper sanitary organisation which at the present moment was wholly wanting, and until that was done efficient sanitary work in India was impossible.

Alexander Crombie, C.B., M.D., the President, remarked that there were before us two object-lessons in connection with mosquito destruction, one at Havana in Cuba, where the mosquitoes and, the disease they caused, yellow fever, have been exterminated, the other at Mian Mir, which has been referred to frequently. In Mian Mir the attempt was unsuccessful, owing to the limited extent of the area experimented upon, and from the fact that irrigation of the soil was carried on within the experimental area. So long ago as 1342 in Spain, rice-growing was prohibited owing to the danger to health caused by the insects in the rice-fields. The civil surgeons in India have multifarious duties allowing of but little time for such work as mosquito destruction. With an area to be dealt with frequently equal in area to six English counties, the sanitary work of a civil surgeon is of a magnitude requiring all his time and strength.

Louis Sambon, M.D., and H. D. McCulloch, M.B., also took part in the discussion.

Dr. J. W. W. Stephens, in his reply to the remarks of the speakers, said that the regular food of mosquito larvæ was unknown. Smoke did not seem to be a prophylactic, only a means of temporary paralysing mosquitoes, in which state they might be caught. Intermittent quinine prophylaxis was useless. The question of the mosquito destruction was not yet settled by any means.

Infectious Jaundice.

By T. M. Sandwith, M.D., F.R.C.P.

Lecturer at the London School of Tropical Medicine; Consulting Physician to Kasr-el-Ainy Hospital, Cairo.

Infectious jaundice is an acute infectious disease characterised by fever, jaundice, enlargement of the liver and spleen, nephritis, and certain nervous symptoms. The disease becomes at times epidemic during the summer months; it is not contagious, and immunity appears to be afforded after one attack.

Geographical Distribution.—Outbreaks of infectious jaundice have occurred in Britain, Germany, the United States, Asia Minor (Smyrna), and Egypt (Alexandria). Doubtful cases have been reported from Greece, Turkey, Dalmatia, Malta, and the Ionian Islands. It is probable also that the disease under other names exists in many tropical countries.

The persons attacked seem to be chiefly men from 20 to 30 years of age; the poorest classes suffer severely, but the disease is not confined to them.

Etiology.—No microbe has yet been found, and although the *Culex fatigans* is suspected to be the transmitter of the disease this has not been proved.

Signs and Symptoms.—After an incubation period of one or two days only, the course of illness in infectious jaundice may be divided into three stages: (1) Primary fever, lasting three to five days, commencing suddenly with rigors, a temperature rising to 102° or 104°, vomiting, and general pains. (2) Jaundice usually shows itself on the fourth or fifth day of the illness, at which time tenderness of the liver, enlargement of the spleen, and albuminuria develop. After seven to nine days the fever subsides and the jaundice gradually disappears. (3) In about three-fourths of the cases secondary fever, lasting also for some seven to nine days, occurs. The whole illness lasts three weeks. Of the concomitant signs and symptoms, the chief are headache, giddiness, and insomnia, delirium and, in grave cases, a typhoid state ensues, muscular pains at nape of neck and in the calves of legs. Epigastric pain, nausea, and bilious vomiting occur in the first stage, with constipation or diarrhœa. Epistaxis at the end of the first stage, intestinal hæmorrhage during the second stage, and hæmorrhages from the gums, kidneys and stomach and beneath the skin, are not infrequently seen. The changes in the urine consist of: (*a*) during the first stage the urine is acid, scanty,

high-coloured, and with a trace of albumen; (*b*) during the second stage the quantity of urine may only amount to two or three ounces in twenty-four hours; the colour is greenish, albumen is plentiful, bile pigment is present, and blood casts are met with. In favourable cases the urinary crisis occurs from the seventh to ninth day, and polyuria succeeds. In fatal cases the patient usually dies of uræmia.

The mortality in 300 cases amounted to 32 per cent. of those attacked.

The post-mortem appearances closely resemble those met with in typhus fever, cloudy swelling of organs and hæmorrhages being the rule.

Diagnosis.—The disease closely resembles, clinically, relapsing fever, but it is differentiated by the absence of the *Spirochæte Obermeieri* from the blood. Bilious remittents are differentiated by the absence of parasites in the blood. Acute yellow atrophy of the liver is distinguished by the diminished size of the liver. The infectious jaundice of Alexandria has been termed a variety of yellow fever, but the albumen in yellow fever appears early and in abundance, and the temperature charts are dissimilar.

A question arises, is infectious jaundice synonymous with Weil's disease? They resemble each other closely, only the latter is a much milder disease. If they are the same ailment, the term Weil's disease ought to be abolished.

Jaundice in South Africa.

By Major H. B. Matthias, R.A.M.C.

Jaundice was very prevalent during the South African War, especially during the autumn and winter months. No fewer than 5,648 cases were reported during the three years' campaign. (1) In one set of cases the signs and symptoms were merely those of catarrhal jaundice, with but little if any fever. (2) In another group severe jaundice with pronounced fever. (3) In yet a third variety there was fever, with marked gastro-intestinal disturbance. Fatal results were few; no deaths from the disease occurred amongst Major Matthias's cases.

The nature of the illness is undetermined. The graver forms of the disease seemed to be due to a definite infection—a toxin. Cases of the kind have been termed "modified enteric fever" by Weil, whilst Chautemesse styles them "Fievre Typhoid bilieuse." The cause of the disease is no doubt insanitary conditions. This view is supported by Dr. Sandwith, from experiences gained during the Russo-Turkish War, and by Dr. Ord in a report on an outbreak of febrile jaundice in 1862 at Rotherham, in Yorkshire. In South Africa the cases of febrile jaundice followed at the period of the year when enteric had reached its maximum, and this is in accordance with the observations of Dr. Ord. It would appear, therefore, that the febrile jaundice seen in South Africa is a distinct form of epidemic jaundice, which at times follows outbreaks of enteric fever, and that with enteric rather than with Weil's disease the ailment would appear associated.

Discussion.

Lieut.-Col. Kenneth Macleod, I.M.S. (retired), said that in view of the fact that enteric was rare amongst Natives, so this disease, if affiliated with or dependent upon typhoid infection, should also prove a rare disease amongst native races. He remembers some fifty years ago an outbreak of epidemic jaundice in the Isle of Lewis, Scotland, so that the disease would not appear to be confined to tropical countries.

M. A. Ruffer, M.D.Oxon, President Sanitary, Maritime and Quarantine Council, Egypt, considers that the bilious typhoid of Alexandria is a filth disease, and closely allied to yellow fever. It differed from Weil's disease in many particulars, markedly so, in that the mortality of bilious typhoid was high, some 20 to 30 per cent. or even higher, whereas in Weil's disease it seldom was more than 2 per cent. Weil's disease also came on gradually, whereas in bilious typhoid the symptoms became severe in a few minutes. Moreover, no bacterium had been described in connection with bilious typhoid. The kidney lesions met with *post mortem* were more marked than the account given in books led one to gather. A noticeable change was the hæmorrhages around the hepatic veins, and emboli of hepatic cells occurring within the hepatic vessels.

Major Andrew Bucahnan, I.M.S.: In the Central Jail at Nagpur, India, some five years ago, there were as many as 150 cases of jaundice at one time. The temperature was raised only for a day or two, and the symptoms were very mild, only one man dying of the disease. A similar outbreak had been recorded some twenty years ago in another jail in India. The connection between enteric fever and epidemic jaundice is not apparent, although a number of cases of enteric had occurred amongst the prisoners in the jail shortly before. Enteric fever is not unknown amongst natives of India.

Third Day, Friday, July 29.

The Nature and Significance of the Leishman-Donovan Body.

By Major W. B. Leishman, R.A.M.C.

Professor of Bacteriology, Royal Medical Staff College, London.

The parasites named Leishman-Donovan bodies were first found by Major Leishman in November, 1900, in the blood from the spleen of a soldier invalided from Dum-Dum in Bengal, suffering from tropical cachexia and splenomegaly. Owing to the fact that this soldier, and others in whom the body was found at the Netley Hospital in England, all of whom had served at or near Dum-Dum, suffered from this particular ailment, the parasite was provisionally styled Dum-Dum fever. Since the "body" was discovered a number of cases of the kind have been recorded by Donovan, Marchand and Ledingham, Manson and Low, Bentley, Rogers, and others.

The parasite has been met with in persons from three or four widely-separated districts in India, from China, Tunis, Algiers, Arabia, and Egypt.

In the human body the parasites have been found in the spleen, the liver, the mesenteric glands, the bone marrow, the kidney, and from ulcers in the intestines. They occur in the protoplasm of large mononuclear cells—macrophages, which are of the

same nature as those large phagocytes which, in malarial cases, harbour melanic granules. It is a curious fact, however, that neither the cells in which they reside nor the parasites seem to affect each other in any way. As obtained, however, during life the bodies usually occur free or in groups lying in a structureless matrix or stroma, staining grey or pale blue by Romanowsky's method.

Signs and Symptoms.—In the disease associated wiih the presence of Leishman-Donovan bodies in the blood the chief clinical features are: (*a*) Enlargement of spleen (and liver); (*b*) pallor of the skin with emaciation in the advanced stages; (*c*) an irregularly remittent fever, lasting usually for many months, with or without remissions; (*d*) epistaxis, subcutaneous hæmorrhage and bleeding from the gums; (*e*) œdema of various regions of the body of a transitory character; (*f*) congestion of the lungs and diarrhœa or dysentery, are common complications; (*e*) a marked mononuclear increase in the blood.

The symptoms just related are very similar to those of kala-azar, and Bentley has reported finding the "bodies" in the spleen of cases of this disease.

The nature of the parasite is at the present time the subject of acute discussion: (1) Laveran, from a study of blood films sent him by Donovan, regards the bodies as belonging to the piroplasmata, and called the parasite *Piroplasma Donovani.* This view is open to many objections. In the first place the bodies have never been seen in the red cells of the peripheral blood, and further the arrangement of the chromatin, the method of apparent multiplication, and the tendency to occur in the protoplasm of the large mononuclears would seem to be arguments against Laveran's statement. (2) Major Ross considers the parasites to be a new species of the sporozoa, and considered the individual bodies as spores produced in the matrices, which would appear to be relics of the parent organism. (3) Leishman believes that the bodies are involuted forms of trypanosomes or encysted trypanosomes representing a stage in the life-history of these organisms, or of some closely-allied member of the flagellata. In this view Major Leishman is supported by Schaudinn from observations made by a blood parasite of the stone-owl,[1] when taken into the stomach of the mosquito, *Culex pipiens.* Schaudinn comes to the conclusion that this halteridium is, in reality, a sexual form of a true trypanosome, to which he gives the name *Trypanosoma noctuæ.*

A fact pointed out by Christophers, Manson and Low, that these "bodies" are present in ulcers of the intestines is of the first importance, not only as it accounts for the presence of dysenteric symptoms, but more important still, that it affords a possible explanation of how the parasite may escape from the human body. The presence of Leishman-Donovan bodies in Delhi boils described by Wright is a fact that may point in the same direction.

By telegram we learn that Capt. Rogers, working in Calcutta, has succeeded in developing trypanosomes from cultures of the Leishman-Donovan bodies. This is a great step forward if it is substantiated, and we await the further announcement of Capt. Rogers' work with interest.

[1] See page 239 of THE JOURNAL OF TROPICAL MEDICINE, August 1st, 1904.

CACHEXIAL FEVER IN INDIA, ASSOCIATED WITH CUNNINGHAM-LEISHMAN-DONOVAN BODIES.

By Capt. LEONARD ROGERS, I.M.S.

Acting Professor of Pathology, Calcutta.

The great majority of the cases of Calcutta illness known hitherto as "malarial cachexia," at any rate during the hot weather months, when true malarial cases are at their minimum, are really cachexial fever, due to the new parasites. In over five-sixths of the cases of cachexial fever examined by Capt. Rogers in Calcutta, positive results as to the presence of the "bodies" were found.

The parasites have been found in Calcutta in Europeans, Hindus, Mahommedans, Chinamen and Burmese.

Malarial cachexia resembles kala-azar very closely in its clinical symptoms, and now that the "bodies" have been found in cases of kala-azar the identity of the diseases would seem probable, if not even assured. The general clinical characters of both malarial cachexia and kala-azar have been frequently described, and even under the new light thrown upon them by discovery of their probable cause there is nothing new. In chronic cases the temperature is extremely irregular, at times of a very irregular remittent type, and then normal for days together, followed by recurrent remissions. In quite early and progressive cases there is nothing to distinguish the temperature curve from that seen in malarial fevers. When the splenic enlargement is apparent the fever follows an irregular double remittent type of fever, a form which frequently continues into the chronic form of the disease.

The blood changes consist of a marked increase of the proportion of the large mononuclear white corpuscles, a moderate reduction of the percentage of hæmoglobin, and a most remarkable and constant reduction in the number of white corpuscles, especially of the polynuclears.

The *secondary infections*, which bring about a fatal termination in cachexial fever cases, are cancrum oris and meningitis, cancrum oris and dysentery, phthisis, phthisis and dysentery, pneumonia, dysentery, cirrhosis of the liver, hæmatemesis and cerebral hæmorrhage.

CULTIVATION OF THE PROTOZOAL PARASITE OF CACHEXIAL FEVER AND THE DEVELOPMENT OF TRYPANOSOMA IN CULTURES OF THE CUNNINGHAM-LEISHMAN-DONOVAN BODIES OF CACHEXIAL FEVER AND KALA-AZAR (*Lancet*, July 23, 1904).

The Cunningham-Leishman-Donovan bodies found in the spleens and other organs in cases of cachexial fever (previously known as malarial cachexia), present evident characteristics of protozoal parasites, although the exact class to which they belong is still disputed. Recent successful cultivation of another protozoal parasite—namely, the trypanosoma—led me to try to get the former organism to live and to multiply outside the body, in order to allow of its life-history

being more closely studied. For this purpose I placed infected blood, obtained from the spleen during life, in small tubes with a little citrate of soda solution to prevent the blood clotting, and kept it under varying conditions. First, they were incubated at 37° C., but it was found that, even when numerous in the original blood, they had nearly completely disappeared within twenty-four hours, only a few, lightly staining, evidently degenerate forms, remaining. It, however, occurred to me that in the case of the trypanosoma the organism had been found to live longer outside the body when kept at a lower temperature than it did at blood heat, so I placed some similar culture tubes in an incubator at a temperature of 27° C. I then found that the organisms retained their natural characteristics for several days, and in blood films made from the tubes they stained quite as well as in the blood freshly taken from the spleen during life, while not only were they in undiminished numbers, but they were actually more numerous than before. At first I thought this might only be an apparent increase, as the number of parasites found in two slides made at the same time from fresh blood may vary considerably, but by repeating the observation a number of times I have been able to get conclusive evidence that an increase in the number of the organisms had actually taken place in the culture tubes.

This evidence is of two kinds. First, films were made each day from the fluid blood medium, and the number of organisms found in many fields in various parts of the specimen was noted, and it was found that even when they were scantily present in the freshly taken blood, they could be found in much larger numbers after from one to three days' incubation at from 22° to 27° C., while in some instances in which they had been numerous in the fresh blood, two or three being found in a single field, after one or two days they had become so numerous that from fifty to one hundred have been counted in a single field of an oil immersion lens. Secondly, and of still greater value, is the fact that in the films made after incubation forms, showing various stages of subdivision, were relatively very numerous, while in those specimens which originally showed a large number of the organisms, enormous numbers of the smallest forms were found, many of them in clumps of from ten to twenty or more, several of which were often seen within a single field of an immersion lens. Around these very numerous forms of varying sizes were scattered so thickly as to look as if they had been sprinkled from a pepper-pot, as was remarked by one medical man on seeing them. Now, it is a very marked feature of films made from freshly drawn spleen blood that the proportion of forms undergoing subdivision is extremely small, so that a good deal of search through specimens showing numerous parasites is necessary in order to make out different stages of the subdivision, such as I have already described in a former communication, and Lieut. R. S. Christophers, I.M.S., also remarks on the rarity of these forms in ordinary spleen puncture films. Yet, in my specimens from the culture tubes, it is quite common to see a number of dividing forms in varying stages in a single field of the microscope, and I have met with fields showing nearly complete series of these forms. In such specimens it is easy to make out two methods of multiplication of the parasites. In one form the typical oval organism with a large and a small nucleus enlarges to beyond the usual size, then each nucleus divides once, so that two large and two small nuclei are present in a single cell, after which the cell itself divides into two, the point of division being at one end, so that just before the final separation the other ends alone remain united. A second mode of division, which evidently accounts for the very numerous new small forms of the organisms which are very rarely seen in fresh films, commences very much as I described in my former paper, by the nuclei undergoing multiple division until a number of them are seen in a single cell. Next, in the culture, a kind of slimy zooglea mass is formed, the outline of the original parasite having disappeared, and the minute multiple nuclei appear to sort themselves out in pairs of a large and a small nucleus, which gradually increase in size but have as yet no capsule. When they reach a certain dimension, which is smaller than the usual form found in spleen puncture blood, a capsule appears around each, forming a characteristic group of complete young parasites such as occurs in fresh spleen blood. It is worthy of note that in these specimens the blood corpuscles have nearly, or entirely, been dissolved, and have therefore disappeared, so it is quite certain that the forms of subdivision just briefly described take place outside the red corpuscles, and in no stages have they been observed within them. It is clear, then, that the parasites are not piroplasma.

As I found the organisms died out within a few days at 27° C., I next tried a temperature of 22° C., and soon found that it was more suitable for their growth, as even when very few in the freshly drawn blood, they were found in much larger numbers within a day or two. Further, a number of larger forms than I had seen in the fresh blood appeared in the citrated blood at this temperature, which led me to look out carefully for flagellated bodies, as the two nuclei of different sizes suggested to me a resemblance to trypanosomes, just as it did to Leishman before. This search was soon rewarded by my finding fully-developed trypanosoma in two cases in the cultures. They were best developed in a spleen blood after one day's incubation, although only the usual oval forms were found in the freshly drawn blood and showed many forms undergoing longitudinal splitting, with double flagellæ, macro- and micronucleus complete, together with pear-shaped flagellated forms, exactly similar to those described by Plimmer in trypanosoma of tsetse-fly disease. The other case, fortunately, was one of kala-azar from Assam, for the spleen blood of which, taken by puncture, I am indebted to my assistant, Assistant-Surgeon G. C. Chatterjee. In cultures of this many intermediate forms and a few complete trypanosoma were found. Thus, this new human trypanosoma has been obtained by culture of the bodies found in the spleen by Leishman, so that the latter must be one stage in the life-history of the organism and not degenerated forms, as he at first thought them to be. Further, they have already been obtained from both

the endemic form of cachexial fever seen in Lower Bengal, and also in the Assam epidemic form known as kala-azar. It is worthy of note that Assistant-Surgeon Chatterjee found a living trypansome in an Anopheles mosquito some time ago,[1] while I am also indebted to him for help in the microscopical examination of my cultures. I hope to be able to publish illustrations of the different stages of the development of the trypanosome at an early date.

Prophylaxis and Treatment.—Quinine, according to Dr. Dodds Price (*Ind. Med. Gaz.*, Oct., 1901), seems to be a reliable prophylactic against the virulent form of kala-azar. Quinine has also been frequently seen to stop the fever or greatly decrease it. It is probable that the hypodermic or intravenous method of administration may prove the most satisfactory. Treatment by red medulla tabloids, a fresh uncooked bone-marrow, also gives promise of beneficial results.

Human Piroplasmosis.

By Major C. Donovan, I.M.S.

Physician, General Hospital, Madras.

On April 9th, 1903, Major Donovan found the parasite known as the Leishman-Donovan body in the spleen at a *post-mortem* examination. Leishman had previously found the parasite in November, 1900. Amongst the clinical symptoms Major Donovan mentions a skin eruption in almost all the cases. The skin is dry, furfuraceous and irritable. At times there are eruptions simulating those of itch, causing by scratchings small ulcers. In two cases the ulcers increased in size and came to resemble very closely Delhi boils. Laveran and Mesnil, after examination of films sent them by Major Donovan, came to the conclusion that the organism belonged to the piroplasmata.

Some Notes upon Kala-azar and the New Parasite.

By Chas. A. Bentley, M.B.Edin.

Tezpur, Assam.

Kala-azar is an endemic disease, occasionally becoming epidemic, occurring in many parts of India and probably in other parts of the world. The general signs and symptoms are well known. They advance gradually; enlargement of the spleen and sometimes the liver, emaciation and irregular fever, and pain in ends of long bones. The febrile symptoms sometimes usher in the disease, or again, acute gastro-intestinal, dysenteric symptoms or pneumonia are the first indication of illness. Hæmorrhage from various parts and anæmia are frequently present. The only accurate method of diagnosis is examination of the blood drawn from the spleen during life. Quinine is perfectly useless either as a prophylactic or specific remedy.

The parasite of kala-azar is of an elliptical shape, measuring $1\frac{1}{2}$ to nearly 4 microns in length, by 1 to $2\frac{1}{4}$ microns in breadth. The smaller bodies are more fusiform in shape, the larger more circular. There is a double nucleus, one large oval nucleus at one end, and a smaller, rod-shaped centrosome placed somewhat at a tangent on the opposite side of the parasite. Stained by Romanowsky's method, the parasites appear to possess a well-marked body wall or capsule. The large nucleus is often seen divided or dividing, whilst the smaller remains undivided. Conjunction has also been seen, with a fusion of the larger chromatin masses; the smaller nucleus takes no part in this.

Although the parasite has been met with in Delhi boil, Dr. Bentley never found them in any sores or ulcers in natives suffering from kala-azar.

In all probability the stroma or zooglea mass seen enveloping a group of parasites is derived from large macrophages fractured during the preparation of microscopic specimens.

Dr. Bentley agrees that the Leishman-Donovan body appears to be the spore of some micro- or myxosporidian; and it may yet be proved that they are a phase in the life-history of some flagellate or other organism. He is of opinion also that the non-parasitic nature of the large macrophages, which so frequently contain the kala-azar body, requires to be demonstrated.

Although many animals have been examined by Dr. Bentley, the parasite in question has never been found in them; nor has it been met with in water. The urine, the sputum and the fæces have been searched in vain by Dr. Bentley for evidence of the parasite.

Patients suffering from kala-azar with high and continued fever show, on splenic puncture, the largest proportion of fission and conjugation forms. In a house in which a member of the family suffers from dysenteric complications in kala-azar, fresh cases of the disease are certain to spread to other members of the household; and when the dysenteric complications are in abeyance, the epidemic assumes a milder type, with a corresponding decrease in the case mortality.

Tropical Splenomegally and Oriental Sore.

By Lieut. S. R. Christophers, I.M.S.

At the present moment it is impossible to place the Leishman-Donovan bodies in any of the general or better known divisions of the *Sporozoa*. Concerning the "matrix" or "zooglea mass" in which the parasites are embedded, Lieut. Christophers is of opinion that it is merely the cytoplasm of endothelial cells of the spleen, more especially those derived from the large macrophages which bud and vacuolate, thereby giving rise to the definite appearance of the masses. The body does not seem to be a parasite of the red blood corpuscle, and therefore cannot be a piroplasma as Laveran contends. Are they a parasite of the plasma? Lieut. Christophers answers this question by saying that they are probably a blood parasite in no other sense than are the organisms of septicæmia or the bacillus of tubercule.

In accordance with the observations of Wright in America, that the bodies are found in Delhi boils, Capt. James, I.M.S., also announces that he has found them in Oriental sore from Northern India and in both cases it would appear that the parasite, serves as a causal agent for the local granuloma of the skin.

[1] *Indian Medical Gazette*, 1901.

In addition to finding the parasite in the usual situations, Lieut. Christophers states that he also met with them in unulcerated papules of the skin, in small and large ulcers of the skin, and in ulcers of the intestine, lying, as a rule, singly in the cytoplasm of tissue cells. He also observed them in the endothelial lining of capillaries, and in the larger vessels in the neighbourhood of granulation tissue the endothelial cells were found containing the bodies in such numbers as to almost block the lumen of the vessel.

Lieut. Christophers concludes that in Leishman-Donovan bodies we have a type of infection in which the vascular endothelium is mainly implicated.

Leishmania Donovani in Ceylon.

By Aldo Castellani, M.D.

Director Bacteriological Institute, Colombo, Ceylon.

So far Leishman-Donovan bodies have only been found in cases with well-marked features of tropical splenomegally. A case met with in Ceylon is recorded by Dr. Castellani in which these bodies were found although the patient presented practically no symptoms of the infection. On a Singhalese, aged 20, who died of lobar pneumonia, a *post-mortem* examination was held within six hours after death. In films from the spleen (which was slightly enlarged), stained by Zieman's modification of Romanowsky's stain, the bodies were found. As a rule they existed as free forms, but some embedded forms were also present. Fifteen to 25 per cent. of the mononuclear as well as of the polymorphonuclear leucocytes presented the "bodies" stained a deep red-purple in their nuclei. Rats injected with *Trypanosoma Lewisi* show in films subsequently taken from their spleens structures very much like the Leishman-Donovan bodies. From the frequency with which the "bodies" were found in the nuclei of the leucocytes, it is possible that we are dealing with a leucocytozoon. This case is of interest as showing the fact that the Leishman-Donovan body occurs in Ceylon; that it was not a typical case of splenomegaly, but perhaps an early stage of the disease; and that the bodies are not intracorpuscular parasites of the red blood corpuscles.

Notes on the Occurrence of the Leishman-Donovan Parasite in Arabia and Egypt.

By Llewellyn Phillips, M.D. F.R.C.S.

Kasr-el-Ainy Hospital, Cairo.

This paper was published in the Journal of Tropical Medicine, August 1st, 1904, p. 236.

Discussion.

In the discussion on the papers dealing with the subject of the Leishman-Donovan body, the following took part:—

Sir Patrick Manson, K.C.M.G., F.R.S., warned medical men against the too free use of needle punctures in cases of splenomegaly. In the enlarged spleen of leucocythemia during febrile attacks, splenic punctures are apt to be followed by alarming hæmorrhage, and already one fatal case of the kind has been recorded. Before puncturing the spleen it is essential that the blood be carefully examined for leucocythemic evidence.

It is important to settle, if possible, the channels of exit and entrance of the Leishman-Donovan body. One prominent fact in connection with this subject is the presence of ulceration in the intestine, accompanied frequently by dysenteric symptoms, and it may be that the intestine is one of the channels by which the parasite leaves the body. The fact also, that the parasites have been met with in Oriental sore may point in the direction of elimination by the skin.

Col. David Bruce, C.B., R.A.M.C: One of the most interesting experiments in connection with this subject is that by Capt. Rogers in the development of the Leishman-Donovan bodies in trypanosoma *in vitro*. Capt. Rogers states that he merely placed a few drops of citrated splenic blood in a test tube and kept it at 22° C., and he saw the Leishman-Donovan body develop into a trypanosome. Col. Bruce objected to any name being associated with Major Leishman's. Leishman discovered the parasite, Donovan only confirmed the observation. He does not suppose it is Donovan's fault that his name has been associated with Leishman's in the manner it has been.

G. C. Low, M.D., Superintendent London School of Tropical Medicine: In regard to the production of trypanosomes from cultures of Leishman-Donovan bodies, Dr. Low stated that he had made cultures of the splenic blood from cases harbouring the parasite, in tubes of hæmoglobin agar and hæmoglobin broth, some at 37° C. and others at room temperature. In neither case did the parasites multiply, and on the second day they disappeared. Fresh microscopic specimens ringed with vaseline also gave negative results. The parasites are found in the macrophages or splenic cells of the spleen, in the secretory cells of the liver, in the marrow cells, and also apparently in some situations in the endothelial cells. In further investigations into the nature of these bodies, experimental inoculation should be tried. It is also expedient to investigate splenic anæmia (Bruhl's disease) in the light of this newly-discovered cause of splenomegaly. It is also advisable, in view of Schaudinn's recent work concerning the change of an intracorpuscular pigmented parasite (*Halteridium*) into a trypanosome, to consider the possibility of the "bodies" having to do with the resting stage of malaria. There is no direct evidence pointing that way, but the evidently wide distribution of the Leishman-Donovan parasite is significant, seeing that it occurs plentifully in malarious countries.

Jonathan Hutchinson, F.R.S., said the presence of the Leishman-Donovan bodies in Delhi boil was an important discovery. Previously he had looked upon Delhi boil as being possibly of the nature of lupus, and therefore bearing a tubercular interpretation.

Col. Kenneth MacLeod remarked that the hæmorrhage in splenomegaly connected with Leishman-Donovan bodies is apparently more advanced and pronounced than in kala-azar.

Alexander Crombie, C.B., M.D., said that the pigmentation met with in cachexial fever may possibly be due to the presence of the Leishman-Donovan body and not necessarily malarial. It was well known that camel drivers and those who looked after camels were liable to a form of Oriental or Scinde sore. They are put down to bites from camel-flies,

ALEXANDER CROMBIE, C.B., M.D., Brigade-Surgeon-Lt.-Colonel I.M.S. (Retired).

President of the Section of Tropical Diseases at the British Medical Association, held at Oxford, July, 1904.

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but it must be remembered that the camel is the subject of trypanosomal infection, and the aggravated sores in man caused by the flies which bite the camel, and subsequently man, may be explained by infection by the new bodies, or direct trypanosomal inoculation.

Dr. Louis Sambon also took part in the discussion.

Leprosy a Curable Disease.

By J. T. Tonkin, L.R.C.P. & S.Edin.

The conception of leprosy by the public, and even by the majority of the medical profession who have not been brought in contact with the disease, is that leprosy is an incurable disease and that the leper is condemned to an early death. The one treatment uppermost in most minds is segregation, and although no doubt in earlier times isolation was a useful weapon, it is not consistent with present-day knowledge. Mr. Tonkin is of opinion that leprosy often yields to the influence of improved circumstances, be they the result of wise supervision in an institution or otherwise; and in this respect leprosy resembles tuberculosis. Owing to the lowering of a person's vitality from any cause, the bacillus of tuberculosis crept in and caused its destructive influence, and it is much the same with leprosy. Although in a sense leprosy is incurable, inasmuch as we have no remedy which affects its course, as mercury does in syphilis and antitoxin does in diphtheria, and although one cannot restore the lost finger or lobule of the ear, still that the disease can be arrested and practically cured is the view that most leprologists take of the disease at the present time.

The average period over which leprosy extends does not usually exceed a dozen years. Now if a leper outlives this period of twelve, or say fifteen, years the disease will be in a quiescent state, and if he survives twenty years the signs will be so indefinite as to defy recognition. Of 220 cases of leprosy examined in the Soudan by Mr. Tonkin, 24 per cent. had survived the fifteen-year limit, and 8 per cent. had lived for twenty to twenty-five years since first attacked. After this time we can no more say the individual is a leper than we can say a person is tuberculous because he has an old healed fibroid scar, left after tubercular trouble in his lung from a time long gone by. It is not necessary to say a man is not a leper that he be absolutely free of the leper bacillus, for a man is only a leper when the reaction that takes place between the constituents of the bacilli of the disease and those of the tissues they invade ceases. The vitality of the bacilli is gone and their influence almost certainly *nil*, allowing of the organs of the body performing their normal functions, and the leper can work and earn his livelihood; in such a condition the man is not in danger of infecting his neighbours.

As showing the importance of bringing home the fact to the public that leprosy is a curable disease, nothing has occurred to more thoroughly impress the fact than a recent letter in the *Cape Times* of April 6th, 1904, concerning the lepers in Robben Island. The writer states that lepers have been condemned to reside in Robben Island for three to ten years, and then been sent away from the asylum because it was found they were not suffering from leprosy at all. The indignation expressed in the article is uncalled for, as there is no doubt that these were cases of cure. Careful treatment had freed the lepers of all signs of their disease, and they were sent out practically well.

Discussion.

Jonathan Hutchinson, F.R.S., had no doubt about the improvement that took place in many cases of leprosy; if the patient can be made to live for a certain number of years the active features of the disease subsided. When a patient was found in the early erythematous stage of the disease, good food and diet and residence in England or some country away from possible sources of infection, he certainly seemed to recover. Mr. Hutchinson showed photographs of a leper in which, by treatment for nine months with moderate doses of chaulmoogra oil and judicious general treatment all signs and sypmtoms had practically disappeared. He also mentioned the case of a leprous woman who had been free of the disease for twenty-five years. He considered relapses under favourable conditions unlikely.

James Cantlie, M.B., F.R.C.S., remarked he had little doubt that leprosy as an active disease subsided after a time. He had seen a man in the leper village in Canton who, although he had remained amongst lepers for over thirty years, was practically cured of all active signs of the disease.

Mr. Cantlie had lately seen two cases of leprosy from South America. In certain parts of that continent leprosy developed very slowly and the initial symptoms were very obscure and insignificant, so much so that a numb patch on one of the limbs and loss of eyebrows was sufficient to stamp a person a leper. He had no doubt that many persons in leprous districts had leprosy in mild and transient forms, and the disease disappeared under ordinary hygienic measures, especially when those attacked came to reside in a non-leprous country.

Recovery from Liver Abscess followed by Abscess in the Upper Lobe of Right Lung and Empyema.

By James Cantlie, M.B., F.R.C.S. (London).

Surgeon, Seamen's Hospital Society; Lecturer on Surgery, London School of Tropical Medicine.

Mr. Cantlie described the case of a man, aged 26, who had resided in India for seven years, and was admitted to Sir Patrick Manson's Ward at the Seamen's Hospital, Albert Docks. He had suffered from malaria in Cawnpore on several occasions, and whilst in Assam in 1899 had a mild attack of dysentery. In October, 1903, he developed symptoms of liver abscess. The abscess was opened and drained through an incision between seventh and eighth ribs. In April, 1904, on the way from Bombay to London, hepatic symptoms similar to those he had previously suffered from developed, and increased until he came into the Seamen's Hospital on May 19th, 1904. The signs and symptoms were cough, expectoration of anchovy-coloured pus free from organisms, fever, night-sweats, and impaired resonance over the lower lobe of right lung. Although the liver was not tender nor enlarged

downwards, the expectoration and the history of the case all pointed to a recurrence of hepatic abscess bursting upwards into the lung. With this idea the liver was thoroughly searched for pus; no pus was found and the needle each time struck the fibrous mass left by the healed abscess in the liver. On the following day (May 20th) Dr. Alexander Crombie, C.B., acting for Sir Patrick Manson, explored and found pus in the chest. On May 22nd the pus was reached by trochar and cannula and a large drainage tube inserted acting by syphonage. Although draining freely, it was evident that the lung had collapsed, and a piece of a rib was excised on May 30th and again on June 9th, until the cavity could be examined by the electric lamp and by the hand. The pus continued to flow in spite of all forms of washing and dressing. The liver and the lower lobe of the right lung were again carefully searched for pus, but no pus was found. The pus seemed to come from the upper part of the cavity, but the exact site of exit could never be seen. The patient gradually sank, exhausted, and died on July 17th.

Post-mortem examination showed the scar of an old hepatic abscess involving the upper surface of the liver some two inches in front of the coronary ligament of the liver. The cicatrix was bound to the under surface of the diaphragm. The base of the right lung was firmly adherent to the upper surface of the diaphragm opposite the hepatic scar, but no trace of pus or old scar tissue was present. The site of the recent lesion was found to be the upper lobe of the right lung, an abscess in that lobe having opened into a bronchus and into the pleural cavity causing empyema.

Remarks.—The etiology of the pulmonary abscess is difficult to assign. There was no direct tract between the old hepatic and the recent pulmonary abscess. An embolon from the hepatic vein carried through the heart and hence by a branch of the pulmonary artery to the lung may, in all probability was, the origin of the pulmonary abscess, but the length of time between the healing of the hepatic abscess and the development of the pulmonary abscess is peculiar. A point to be noticed also is that the pus at first contained no organism, and it had all the appearance of pus from a long-standing and discharging liver abscess. Had it been possible to ascertain that the pus came from the upper lobe, and seeing that the lower lobe had collapsed, the proper treatment would have been to ligature the root of the lung and remove the whole organ.

Climatic Bubo from which an Organism was Cultivated. The Relation of Climatic Bubo to Pestis Minor.

By James Cantlie, M.B., F.R.C.S.

From the inguinal glands of a man from the Kolar Gold Fields, Mysore State, suffering from climatic bubo, Dr. R. T. Hewlett, Professor of General Pathology and Bacteriology, King's College, London, and Lecturer on Bacteriology, London School of Tropical Medicine, cultivated an organism which seems to be a diplococcus recalling the appearance of the plague bacillus.

The patient came from a district where plague was prevalent, and on the day before he reached London (February 24th, 1904) he observed a swelling in the left inguinal region. This increased, fever developed, and on March 7th pus was found in the swelling. The glands were excised on March 9th and the tissues sent to Professor Hewlett. He found an organism which he was able to cultivate, but which proved innocuous to animals.

The patient was seen by Professor W. J. Simpson and Dr. G. C. Low, who both agreed with the diagnosis. Mr. Cantlie remarked that he had contended for several years that climatic bubo was a specific disease, that it was allied to plague, and that it was the true pestis minor of the text-books. He had seen the disease in China for two years before the outbreak of plague in 1894. The medical men in the Straits Settlements had many cases of the kind under their care in 1893-94. Professor Simpson had seen the disease in men of the Shropshire Regiment in Calcutta, who had just come from Hong Kong.

Climatic buboes have also been reported as prevalent along the East African, and especially the Zanzibar, coasts.

In Calcutta, Professors Simpson and Cobb found an organism, in the Calcutta cases, before true plague appeared in Calcutta, and Professor Hewlett had found one in the case now under discussion.

That the disease is caused by an organism there can be no doubt; it runs a definite course of from three to four weeks, and evidently at times becomes widespread.

In the German portion of East Africa, Koch, in 1896, found an organism in specimens sent him from a district south of the Victoria Nyanza. He pronounced the organism to be the plague bacillus. I believe it was the same organism found by Simpson and Cobb in Calcutta, and by Hewlett in 1904. It is more than doubtful if Koch's specimens were obtained from cases of true plague. If plague exists in German East Africa, it is of a kind differing in its epidemiology from all other kinds of plague hitherto recorded. It would therefore seem as though we were dealing with a modified form of plague due to an involuted form (for want of a better term) of the plague bacillus. Mr. Cantlie concluded that he was more than ever convinced that climatic bubo is a specific infection, that it is allied to true plague, and that the designation pestis minor (not by that meaning a mild form—pestis ambulans) is the appropriate and scientific terminology for the disease.

M. Cameron Blair, M.D.(Glasgow), Colonial Service, Northern Nigeria, remarked that he had seen a large proportion of the native soldiers in Northern Nigeria suffering from indolent buboes which did not suppurate. He had hitherto ascribed the condition to venereal disease.

Evanescent Subcutaneous Nodules Accompanied by an Eruptive Fever in a Patient from Southern India.

By James Cantlie, M.B., F.R.C.S.

In a patient from the Kolar Gold Fields in Mysore State, Southern India, my attention was recently drawn by R. H. Bremridge, M.D.Oxon, to a number of peculiar subcutaneous nodules in the limbs. At the time I saw the man there were three nodules

present, all in the left lower extremity. One was situated on the front of the thigh, 4 inches below the anterior superior iliac spine; another on the inner aspect of the leg, half-way between knee and ankle; and the third on the antero-external aspect of the leg, 3 inches above the ankle. The nodules felt about the size of No. 6 shot, they were freely movable over the deeper tissues, but the skin was dimpled to some extent over the little lump. Redness extended around two of the nodules for about $\frac{1}{3}$ inch. The patient stated that he had many such nodules on different parts of the upper and lower limbs; that he felt slightly feverish for a day or two when a fresh nodule developed; that the temperature was actually raised 2° or 3°, and that the nodule disappeared in about three weeks. Otherwise the patient looked and felt well. There was no history of syphilis, nor was there any glandular enlargement in any of the lymphatic glands. Several times the patient stated he had observed streaks extending some 2 or 3 inches upwards and downwards from the nodules.

The nature of this lesion remains a puzzle. It was not due to filaria, for there were no filariæ in the blood, nor was any worm found by Dr. G. C. Low, of the London School of Tropical Medicine, who examined one of the nodules I removed. In the microscopic sections (exhibited) made by Dr. Low, the centre of the nodule is seen to be composed of an evidently newly-developed embryonic connective tissue, with dilated lymphatics or lymphatic spaces in its midst; further than that there is nothing to be demonstrated.

The only condition in any way similar I have ever seen mentioned was a series of six cases published by Surgeon A. J. Wildey, R.N., in the *Transactions of the Hong Kong Medical Society*, vol. i., 1889. The paper read before the Society, at which meeting I was present, was entitled "On Some Cases of Lymphatic Obstruction Occurring amongst the Detachment of Royal Marines at Port Hamilton, Corea." In Surgeon Wildey's cases the nodules were somewhat larger perhaps, and the lymphatic streaks more marked; but as in Surgeon Wildey's cases so in my case, I have no hesitation in saying the lesion was due to lymphatic obstruction.

The Fungus of Tinea Imbricata.

By Fleet-Surgeon P. W. Bassett-Smith, R.N.,
Lecturer on Tropical Medicine, Haslar.

In the Malay Peninsula, East India and South Sea Islands, and, as quite recently announced, in Brazil, tinea imbricata is mostly found. Many views as to the nature of the fungus of the disease have been expressed, and Manson terms it trichophyton-like. From careful observations made over a number of years, Bassett-Smith believes that the fungus is not a Trichophyton but belongs to the *Aspergillus* group of the *Perisporiaceæ*. It differs, however, from the *Aspergilli* inasmuch as it has two forms of reproduction, one by gonidia from the gonidiophores, and another by the development of oval spores dried from the mycelium cells. Bassett-Smith suggests that the name Lepidophyton (Trebondeau) be retained for the fungus.

Sir Patrick Manson remarked that it was very difficult to obtain scales from the skin of persons suffering from tinea imbricata free from fungus forms other than the one in question, and Fleet-Surgeon Bassett-Smith's results might require to be considered in that light.

A New Nematode.

By Sir Patrick Manson and John Catto, M.D.Aberd.
London School of Tropical Medicine.

Preliminary Notice.

In a Chinaman, dead of cholera in Singapore, Dr. Catto found peculiar enlargements and thickenings of several of the abdominal organs. The liver was enlarged and nodular, the spleen greatly enlarged, showing malarial pigmentation; mesentery thickened; large intestine and posterior wall of bladder thickened; mesenteric and many intrapelvic glands greatly increased in size, the largest assuming the dimensions of a golf-ball. Microscopic slides of these tissues (exhibited) showed small, oval, double-walled bodies, from 68 to 70 μ in length by 34 to 40 μ in breadth. They were ova of some parasite and they existed in prodigious numbers in the submucous membrane of the large intestine and in smaller numbers in the subperitoneal tissues of the large intestine. A minute adult nematode was found in an artery of the meso-rectum, and in the worm immature ova were seen. A free nematode embryo was also made out in a blood-vessel leading to a mesenteric gland.

It would appear that Dr. Catto has found an oviparous nematode of a species new to pathology.

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By Fritz Schaudinn (Rovigno).

(*Translated from the German by P. Falcke.*)

(*Continued from p.* 241.)

(*h*) The Maturity of the Macrogamete and its Fertilisation by Means of the Microgametes.

The maturity of the adult female halteridium only takes place after the blood has been emptied into the intestine of the mosquito. The coarse processes of fertilisation and the formation of the ookinets have become well-known by means of the researches of MacCullum, Koch and others, and I can substantiate them fully. I need, therefore, only indicate the finer changes of the nucleus. As soon as the microgamete makes its exit from the warm-blooded host it becomes globular, and thereby bursts through the residue of the erythrocyte which had surrounded him like a delicate sheath. The chromatin in the nucleus arranges itself in the form of a long spiral filament, while the blepharoplast, which formerly lay on the surface of the nucleus, moves right into it, and is transformed into a spindle. The filament of chromatin then exhibits segmentation into four longitudinal and four transverse portions. Unfortunately I was unable to follow up this stage, I cannot, therefore, say by which of the well-known methods

the reduction takes place. The four segments of the chromatin filament then represent four isolated groups of four. The original centrosome of the female nucleus has disappeared, I can at present say nothing as to what has become of it. The central spindle of the first reduction division is yielded by the blepharoplast as previously mentioned. At the first mitosis which now follows, the four groups of four are now divided into four groups of two pairs. In the blepharoplast, in consequence of the close situation of the chromatin reduction, I have hitherto not been able to find out anything definite. I only know the final results, namely, that at last, before the fertilisation, it also only has four chromosomes. In the second division the two groups of four of the nucleus are divided into four single ones; the blepharoplast again functions as the central spindle.

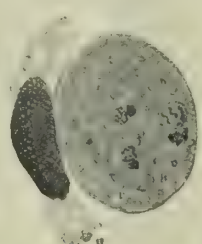

FIG. 8.—Macrogamete after the termination of the process of ripening. The residue of the host cell is seen. (Schematic.)

Fig. 8 illustrates the final result of the entire process of ripening. On the right the reduced nucleus, with four chromosomes, is observed. Next to it is the blepharoplast, with the centrosome and four chromosomes. At the left lie the two residual bodies which are likewise composed from the nucleus and the blepharoplast.

It is only now that the macrogamete is capable of fertilisation. The microgamete then penetrates it in the well-known manner through a cone of attraction at the spot where the female nucleus lies and adjoins itself thereto. Its flagellate apparatus perishes by becoming granularly disintegrated, and only its nucleus, consisting of four chromosomes and the blepharo-

FIG. 9.—Formation of the ookinet. Nucleus in the stage of the spindle of fertilisation. (Schematic.)

plast, which is not yet reduced, are still to be seen. Whereas the nucleus lies close to that of the female, the blepharoplast undergoes two divisions of reduction in which, however, unfortunately, I could not follow the condition of the chromosomes. The two nuclei form the well-known elongated spindle of fertilisation, while the two reduced blepharoplasts move to the pole of the spindle. Notwithstanding their remarkable similarity to a spindle of division, this formation, which has already been seen in so many sporozoa, has nothing more to do with the increase of the nuclei.

Fig. 9 represents the copula at this stage, which has in the meantime become the ookinet.

The nucleus gradually rounds itself off, the blepharoplasts move into it and amalgamate. We have then arrived at the stage of the ookinet from which our observations started, and herewith the cycle of development is complete. In my complete work I will go back to the theoretic value of the discoveries for the problem of fertilisation and heredity. The results in general coincide well with my earlier investigations on Rhizopoda, but they also form a bridge for the comprehension of the conjugation of the infusoria compared with the fertilisation of the metazoa. After we have learnt the changes of the parasites, even during their history of development, it is still necessary to consider their relation to the animal hosts and first of all their migration through the body of the mosquito. Before doing this I must give some account of the structure and physiology of the mosquito.

(*To be continued.*)

Reprint.

ON SOME CASES OF LYMPHATIC OBSTRUCTION OCCURRING AMONGST THE DETACHMENT OF ROYAL MARINES AT PORT HAMILTON, COREA.

By Surgeon A. J. WILDEY, R.N.

[AN article referred to in the paper on "Evanescent Subcutaneous Nodules," at p. 264 of the present issue of the JOURNAL, republished from the *Transactions of the Hong Kong Medical Society*, 1889.]

Out of one hundred Royal Marines who formed the garrison of Observatory Island, Port Hamilton, Corea, six presented themselves at the infirmary suffering from a pathological condition which seems to have been hitherto undescribed. Roughly, this may be be defined as a painful, indurated, subcutaneous band or cord, following the course of the main superficial veins of one or more of the extremities, commencing above and *extending downwards*, accompanied by local erythema, œdema and hard subcutaneous tumours in certain positions, which are relatively the same in either upper or lower extremity.

General Symptoms.—The disease commences with faint red lines of erythema which, taking their origin at the upper part of the inner surface of the limb, within a few hours extend the whole length of the large superficial vessels. In the upper extremity these lines commence about 3 inches above the elbow-joint, and in the lower at the apex of Scarpa's triangle.

The patient complains of more or less pain and stiffness. No rise of temperature occurs at the outset, and little or no constitutional disturbance. In a day or two there is considerable induration along the course of the basilic or the internal saphenous vein, and an indurated, painful tumour, about the size of a walnut, surrounded by a halo of erythema, forms at the upper limit of the induration (*i.e.*, 3 inches above the elbow, or at the apex of Scarpa's triangle).

The tumour continues to increase in size and induration, and its apex assumes a yellowish tint. The temperature may now rise a degree or two above normal. No suppuration occurs, the erythema disappears, and the tumour commences to subside after having existed about seven days, and another similar swelling occurs about 3 inches *below* the elbow-joint, or 4 or 5 inches below the knee. The lymphatics about the flexor surfaces are now hard and cord-like, the patient is unable to fully extend the limb, and cord-like processes may be noticed radiating from the tumours.

About the fourteenth day another swelling forms on the back of the wrist, or, if in a lower extremity, close behind the internal malleolus, and perhaps another on the dorsal surface of the hand or foot between the second or third metacarpal or metatarsal bones. The superficial lymphatic glands are either not enlarged or very slightly so. The gland above the internal condyle of the humerus is perfectly distinct from the tumour in the upper arm. The skin is freely movable over the tumours. At the end of three or four weeks the patient is either perfectly well or there is some brawny swelling, œdema of foot and ankle, and patches of ecchymosis, with discolouration along the course of induration remaining.

Constitutional disturbance is slight. In one case there was vomiting at first. The above symptoms are those of typical cases, such as occurred in five out of the six cases reported, and also observed amongst the native population.

No history of injury, abrasions, &c., is obtainable.

The detachment of Marines were supplied with fresh provisions and vegetables; all water used for drinking and cooking purposes was condensed. The disease occurred during the winter months, *i.e.*, January to April. In one instance a relapse took place in September.

The age of the men affected varied from 22 years to 27. Average length of time on " Sick List," 18 days.

Case	Name	Age	Rating	No. of Days Sick	Date of Admission
1	Boyes, H. J.	24	Gr., R.M.A.	22	February 8, 1886
2	Ward, J. ..	27	Private, Marines	15	,, 27, ,,
3	Wansbury, F.	23	,, ,,	11	March 18, ,,
4	Rudman, T.	25	,, ,,	21	April 25 and Sept. 18, ,,
5	Stevens, Hy.	26	,, ,,	27	January 24, 1887
6	Brindle, —	22	,, ,,	15	February 1, ,,

A Typical Case is appended.

Day 1st. Swelling and redness about R. basilic vein, faint red lines extending to the flexor surface of fore-arm. Temperature 98·4.

2nd. Above symptoms more marked. Temperature 98·4.

3rd. Swelling and induration leaving upper arm; same condition appearing in fore-arm, where there is a patch of induration 3 inches below elbow-joint in front. Temperature 98·4.

4th. Swelling and induration leaving upper arm; same condition appearing in fore arm, where there is a patch of induration 3 inches below elbow-joint in front. Temperature 98·4; increase of pain.

5th. Pain in right shoulder. Fore-arm continues erythematous.

8th. Swelling leaving fore-arm and extending to wrist and hand. Temperature 98·4. No pain in shoulder.

9th. Lymphatics along the course of veins on the flexor surface of elbow hard and cord-like.

13th. Former nodules have disappeared, fresh nodules on flexor surface of fore-arm.

16th. Nodules disappearing.

22nd. To duty. Slight induration along the course of the anterior ulnar, median basilic, median and basilic veins.

Remarks.—Case 1. The right arm only affected. Three tumours, each lasting about six days. No elevation of temperature, axillary glands not enlarged. No suppuration. No constitutional disturbance.

The most interesting and striking feature in these cases is the progress of the erythema and induration, *downwards* against the venous or lymphatic stream. As far as could be made out, there was no obstruction to the venous blood flow, varicosity, nor obliteration of the veins. The tumours never suppurated. The constitutional symptoms were never severe, and in only one case the temperature reached 102°. The patients were all young and healthy men, free from constitutional syphilis. A marked symptom in one case was the brawny swelling of the foot. This brawny condition did not pit upon pressure and was altogether different in appearance and to the touch as compared with the co-existent œdema of the ankle. I am inclined to think that all these symptoms are due to a temporary local obstruction to the lymphatic current.

Notes and News.

Interesting Demonstration at Bradford.—An interesting experiment took place the other day at Bradford Fever Hospital, to show the advantages of the dry Clayton Gas system for disinfecting purposes. This gas is extensively used all over the world to disinfect ships having or suspected of having disease on board, and to destroy rats and vermin, and at the suggestion of Professor Simpson, the Clayton Company is not manufacturing a portable machine for disinfecting houses, hospitals, barracks, &c. It was one of these machines which was shown in operation at Bradford, Dr. Arnold Evans, Medical Officer to the Corporation, and several local medical men being present. Bedding, linen and furniture were left in the ward, and to test the effects of the gas, tubes containing cultures of plague, cholera, typhoid, and *Micrococcus aureus*, and a mattress covered with bugs, taken from an insanitary house, were exposed. Some of the cultures used were wrapped in twenty-four folds of blankets, others placed inside a mattress, others in a cupboard, and so on. Everything being in readiness, the sulphur was lit in the Clayton apparatus at 11.30, the gas cooled and pumped into the ward, which, in

a few hours, notwithstanding considerable leakage from many parts of the ward, contained a 10 per cent. strength of gas. On the ward being opened up there was not the slightest trace of damage to the contents, except the bugs, which were killed, and the microbes, which were found to be sterilised, even those contained in tubes wrapped in twenty-four folds of blankets.

The employment of this machine would mean a considerable saving in time and labour to authorities in charge of infectious hospitals. The advantage of being able to disinfect *in situ* is obvious, and avoids the necessity of sending bedding, &c., to a central station. That the gas is also a thoroughly reliable germicide and penetrates everywhere is also conclusively proved by the above experiment.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Plague.

PREVALENCE OF THE DISEASE.

India.—During the weeks ending July 9th and 16th, deaths numbered 1,910 and 1,995, respectively.

Cape Colony: Port Elizabeth.—During the weeks ending July 9th and 16th, fresh cases 1 and 1, respectively. No deaths.

Transvaal.—Weeks ending July 9th, 16th, 23rd and 30th, fresh cases 2, 0, 0 and 0, deaths 0, 0, 0 and 1, respectively.

Hong Kong.—During the weeks ending July 23rd and 30th and August 6th, fresh cases 25, 17 and 13, deaths 25, 17 and 12.

Mauritius.—During the weeks ending July 28th and August 4th, fresh cases 1 and 1, deaths 0 and 1.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Trypanosomiasis.

CAZALBON. Mbori experimentale et note sur la soumaya. *Bulletin de l'Academie de Médicine Paris*, 1904, vol. lxviii. No. 17.—Mbori is a "fly disease" affecting dromedaries in the French Soudan (Timbuctoo). Soumaya, the local name for the affection caused by trypanosomiasis in zebras and cattle in the French Soudan, closely resembles mbori. These diseases are allied to surra and nagana in India and South Africa; but Laveran thinks the trypanosome causing them are distinct entities: The tsetse-fly (*Glossina morsitans*) is unknown in the French Soudan, but the fly *Tabanus Soudanensis* would appear to be the active agent in spreading the disease. Brumpt has described trypanosomiasis in camels at Ogaden; Sergent has met with the ailment in Algeria; and the disease described and experimented with by Cazalbon at Timbuctoo is closely allied to, if not identical with, these. So prevalent is the soumaya, that it is well-nigh impossible to keep domestic animals near the Bani River. Cazalbon sent four healthy horses to the Bani River, and within a few days all contracted trypanosomiasis.

Yellow Fever.

BEYER, G. E. Mouth-Parts and Salivary Glands, Normal and Otherwise, of the Yellow Fever Mosquito. *New Orleans Medical and Surgical Journal*, May, 1904.—Beyer states that the sporozoites met with in the lumen of the head glands of mosquitoes which had produced typical yellow fever infection must be regarded (suspected) as the etiological agents of yellow fever.

PAREISA, P. Prophylaxis of Yellow Fever. *Brazil Medico*, vol. xvii., No. 40.—Pareisa, the Professor of Medicine at Bahia, maintains that yellow fever is an exotic infection in Brazil. He believes that the disease can be transmitted by insects other than the *Stegomyia*.

RIBAS, E. Prophylaxis of Yellow Fever. *Brazil Medico*, Rio de Janeiro, vol. xvii., No. 40.—A series of articles by Ribas has appeared in the *Brazil Medical Journal*. He states that no epidemic ever occurred in San Paulo where the Stegomyia was not prevalent.

Colonial Appointments.

Dr. THOMAS A. DOWSE has been appointed Government Medical Officer at Levuka, Fiji.

Dr. CHARLES E. MAGUIRE has been appointed District Medical Officer of Suva.

Dr. J. A. DE WOLF, Surgeon-General of Trinidad, has left England on his return to the colony from leave of absence, travelling *viâ* America, where he will stay prior to resuming duty.

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4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.

5.—Correspondents should look for replies under the headin "Answers to Correspondents."

Original Communications.

CASE OF ELEPHANTIASIS OF THE SCROTUM COMPLICATED WITH RIGHT INGUINAL HERNIA.

By Dr. W. Renner,
Sierra Leone.

(With Plate.)

Vonjoh a Mendi, age about 32 years, was admitted on March 29th, 1904, into the Colonial Hospital with elephantiasis of the scrotum complicated by a right inguinal hernia. He had come from Bonthe, Sherbro, specially to be operated upon. He was thin and slim, 5 feet 4 inches in height, and apparently in fairly good health. In habit he was intemperate; by this I mean that he drinks like the rest of his countrymen. They are never seen to be drunk. The habit is acquired from childhood; the mothers touch the lips of the baby with their finger moistened in the gin they drink. The nett weight of the patient and tumour was 250 lbs. On the right side is seen a large inguinal hernia, the canal is entirely abolished and the abdominal ring admits easily the closed fist, being about 6 inches in circumference. He has had the tumour for the last four years. The patient's greatest trouble is the enormous weight he has to carry about and with difficulty (*vide* photo illustration).

Operation.

On April 21st, at 3 p.m., he was placed on the operating table, and with the assistance of Drs. Allan, Campbell and Easmon, the operation of excision of the tumour and the radical cure of the hernia, were performed, and completed by 4.40 p.m. The tumour contained large hydroceles; the nett weight of the mass removed was 64 lbs. The bleeding was furious, but was quickly controlled. The patient was removed to bed with some amount of shock, but rallied after the usual treatment, and to all appearance he seemed as if he would get on all right.

Result.

At 8 p.m. on the evening of the operation, his temperature was 99° F. On the morning of the 22nd, temperature 101°. He was quiet and restful and called for his nourishment: his condition seemed so far fairly good, pulse good and quick, the result of the fever. At 3.30 p.m., after the dressing had been changed owing to its being soaked with urine, &c., he suddenly collapsed and died.

Post-mortem examination eight hours after death showed the wounded surface had satisfactory appearance, no secondary hæmorrhage. The operation for radical cure of the right hernia was also satisfactory, no intestine was wounded or involved in the operation. The liver was found to be slightly enlarged, pale and soft; spleen slightly enlarged, fibrous and looking nearly black on section; kidney normal in weight, capsules removed easily; the heart muscle pale, soft and flabby, ventricular walls thin. Patient died evidently from cardiac syncope.

ONYALAI.

A Disease of Central Africa.

By A. Yale Massey, B.A., M.D., C.M. (Tor.).
Benguella, West Africa.

This is the native name of a disease found among the blacks of Portuguese West Africa, and I have learned that it is also met with in the far interior of Africa. As I have not seen a description of the disease in any medical book or journal, I offer the following reports selected from a number of cases which have come under my care during the past five years.

Case 1.—L., a well-nourished native male, aged 25, complained of bleeding from the mouth. Examination revealed a dozen vesicles distended with blood, ranging from a quarter to a half-inch in diameter, situated in the hard palate and buccal mucous membranes. Some of these vesicles were umbilicated, and none could be emptied easily, due to the presence of numerous trabeculæ and the semi-coagulated condition of the blood. For a couple of days new vesicles continued to appear, old ones disappearing. In ten days all the vesicles were gone, and the patient felt quite well again. There was no fever, and the patient complained only of the discomfort in the mouth and a general feeling of weakness.

Case 2.—B., native child, aged 2 years, well-nourished. A half dozen vesicles of blood in the mouth similar to those of Case 1. Passed cherry-coloured urine, normal in quantity. The microscope showed that the colour was due to free blood. Was said to have vomited blood, which may have come from the mouth. In less than ten days the urine was normal and the vesicles had disappeared from the mouth. There was no temperature. There was slight jaundice, and an appearance of lassitude.

Case 3.—S., native male, aged 30. Strong and robust. Said the attack was preceded by fever and pains in the bones. Urine a deep port wine colour, due to free blood, as shown by the microscope. A few blood vesicles were present in the mouth. Patient was very stupid, and complained of gnawing pains in his legs. On the calf of left leg was a bleb of blood 7 inches by 4 inches, which disappeared like a blood blister on being opened. Blood continued in the urine in decreasing amounts for a week, at the end of which time the vesicles had also disappeared from the mouth, and the patient was discharged cured. There was no fever. He had never had a similar attack.

General Remarks.—In none of my cases has there been that appearance of the patient which is seen in acute constitutional diseases. I have met a number of cases similar to Case 1, which could scarcely have been called ill, excepting the vesicles in the mouth, and lassitude. In a few of the mild cases there is a recurrence of the crop of vesicles in the mouth every few months. The natives are very much afraid of the disease, regarding it as most fatal. All my cases have recovered. I have seen but one fatal case, and that was in a strong robust girl, aged 17, who died the next day after the appearance of the vesicles in

the mouth. The only evidence of the disease was the vesicles in the mouth. No autopsy was made.

Diagnosis.—The vesicles in the mouth are easily distinguished from ordinary blood blisters, in that they are not, on opening, easily evacuated, owing to the trabeculæ and the semi-coagulated condition of the blood. The membrane of the vesicle is also thicker and tougher than that of a blister. From bilharzia disease, by the absence of ova, and the urine is uniformly coloured with blood. From hæmoglobinuric fever, by the presence of free blood. I have not observed any petechiæ nor ecchymoses in the skin. It is to be hoped that these notes will elicit more observations on this important disease.

Treatment.—Sixty grains of the bicarbonate of soda and half an ounce of unpurified cod liver oil, each day internally. That the treatment attacks the cause of the disease is not apparent. I am not yet prepared to venture a suggestion as to its etiology.

THE INCIDENCE OF MALIGNANT DISEASE IN HOT COUNTRIES.

By J. Preston Maxwell, M.B., B.S., F.R.C.S.

The incidence of malignant disease is always a subject of importance, and statistics gathered from different lands may prove of no little help in the elucidation of its cause. The writer has had several years' experience in the East, and the results of his investigations into this matter are now placed before the reader.

The investigations were undertaken at the Changpoo Hospital, in the province of Tokien, S. China. This hospital is situated just outside the Tropics, draws its patients from distances of 20 to 40 miles around, and has over 1,000 in-patients in the year.

The number of consecutive patients taken for this investigation was 11,000, ranging over a period of some three and a half years. Amongst this number there were 54 in whom the evidence, clinical or microscopical, was such as to make the diagnosis a practically certain one. Of these 54 patients, 12 were women, 42 were men.

The female patients were as follows :—

Carcinoma.

Breast	4
Œsophagus	1
Rodent ulcer of face	2
	—
	7

Sarcoma.

Lymphosarcoma of axilla	1	Sarcoma of neck ...	1
Lymphadenoma ...	1	,, ,, lung ...	1
Sarcoma, upper jaw	1		—
			5

Of these cases, those of the breast and rodent ulcer were submitted to operation and the tumour examined microscopically. The case of the œsophagus was typical. Of the sarcomata, the lymphosarcoma of the axilla and the lymphadenoma were examined microscopically, but the rest were typical cases, and all died within a short time of coming to hospital.

The male patients were as follows :—

Carcinoma.

Epithelioma of lip ...	1	Epithelioma of scalp	1
,, ,, palate	1	,, ,, eyelid	1
,, ,, leg (site of old ulcer)	1	Of thyroid gland ...	1
,, of penis .	2	,, pylorus	2
,, ,, upper jaw (boring)	1	,, œsophagus ...	7
,, of tongue	1	Rodent ulcer of face	3
,, ,, face...	1	,, ,, ,, groin	1
			—
			24

Sarcoma.

Of femur (periosteal)	3	Of nasopharynx ...	1
Spindle-celled ...	4	,, testicle	1
Of antrum	1	,, of back (melanotic)	1
,, neck	5		—
,, upper jaw ...	1		18
,, lower ,, ...	1		

The carcinomata were mostly examined by microscope. Those of the pylorus and œsophagus (which, however, were typical from a clinical point of view) could not be examined by microscope owing to the impossibility of necropsies in China. The sarcomata were also either proved microscopically or were good examples of the disease.

According to this list the percentage of malignant disease amongst patients coming to the Changpoo Hospital for treatment was as follows :—

Carcinoma	·28 per cent.	of patients applying for treatment.
Sarcoma	·22 ,, ,,	

My own idea is that this percentage is under the mark, and that if necropsies become possible, and also in the course of time as access to the hospital becomes easier, the percentage will rise. In travelling about the country seeing patients, I have seen a fair number of rodent ulcers, but many of these are in elderly people who cannot manage to get as far as the hospital.

No Cancer of Bowel.

Let me call attention to one notable fact, the entire absence in the list of any case of cancer of the bowel. Epithelioma of the anus I have once seen, but never cancer of the rectum or small intestine, nor any case in which I had any suspicion of the disease. In some respects this is strange, as bowel complaints, diarrhœa, dysentery, typhoid, anal ulcers, fistulæ in ano and piles, are common. In fact the two last named give one no little work in operating for their cure.

The people live mostly upon rice, take alcohol very sparingly if at all, and but little animal food. This may have something to do with the result, but there is not enough evidence to show what part this modified diet plays.

On the other side let me call attention to the preponderance of external carcinomata, just under one-half of the cases being included under rodent ulcer or epithelioma of the surface of the body. Here, again, the reason is not very clear, and the matter requires fuller investigation than I have as yet been able to give to it.

To illustrate Case of
ELEPHANTIASIS OF THE SCROTUM.
By Dr. W. RENNER.

John Bale, Sons & Danielsson, Ltd.

SALTS OF POTASSIUM AS A PROPHYLACTIC FOR BLACKWATER FEVER.

By Matthew Cameron Blair, M.D.Glas.
West Africa Medical Staff; Medical Officer, Northern Nigeria.

From Lake Tchad as centre, numerous trade routes radiate through central Africa. A prominent—perhaps, the most prominent—article of trade, along those routes, is native potash. This salt is habitually used as a condiment by all the natives whose country is traversed by the routes in question; and they consider its use necessary for the maintenance of health. They are very glad to get common salt as a luxury; but when they can get it they use it in addition to the salts of potassium, never, by any chance, as a substitute therefor. This, at least, holds good throughout the Western Soudan right down to the Guinea coast; where, also, the natives habitually give potash salts to all the cattle and horses which they value highly.

Now those natives suffer only very rarely from blackwater fever, although, in childhood certainly, they are very much subject to malarial fever. It seems to me rational to believe that it may well be that the comparative native immunity to blackwater fever may be due to this habitual dietetic use of salts of potassium.

Salts of potassium are a constant constituent of red blood corpuscles, and we know that in the absence of these salts red blood corpuscles cannot be manufactured by Nature.

Given a sudden escape of free hæmoglobin into the liquor sanguinis through destruction of red corpuscles, it is reasonable to suppose that, given a plentiful supply of potassium, this hæmoglobin will at once be utilised for the manufacture of new red blood corpuscles; while, in its absence, the free hæmoglobin will escape into the urine. In every malarial paroxysm red corpuscles are destroyed and free hæmoglobin escapes into the blood; but we know very well that hæmoglobinuria is a rare attendant upon malarial paroxysms. Why?

It has latterly been my habit, in Northern Nigeria, to treat malarial anæmia by salts of potassium in conjunction with free exposure to sunlight, rather than by the traditional iron and arsenic; and the results have apparently been most encouraging in my practice, the patients steadily gaining in colour and condition.

It is not unknown that blackwater fever may be accompanied by a spongy and bleeding condition of the mucous membrane of the mouth and naso-pharynx, not unlike that found in scurvy.

I believe that it will be found in the great majority of cases of blackwater fever that there is, in addition to malarial saturation, a history of venereal or of some acutely suppurative disease, *e.g.*, dysentery or purulent ophthalmia, having occurred within the year immediately preceding the attack. Here, then, we have an exhausted condition of the phagocytes. If, in addition to this, we grant the unreadiness of Nature to rapidly utilise available hæmoglobin for the manufacture of new red corpuscles, we have ample reason for an explosion of hæmoglobinuria.

I am quite conscious that this idea may be entirely erroneous, but think that the facts stated justify observations on the lines of making salts of potassium a constant element in the dietary of Europeans in malarious Africa, particularly if they have suffered much from malarial attacks. This may be carried out by substituting an equal proportion of chloride of potassium for a portion of the common salt habitually used, or by neutralising lime drinks by the addition of bicarbonate of potassium.

ANTI-TYPHOID OR ANTI-ENTERIC INOCULATION.

(Being the Lady Mac Gregor Prize Article, for the Year 1903, on "A Critical Examination of the Practical Value of Anti-typhoid Inoculation.")

By Major F. Smith, D.S.O.
Royal Army Medical Corps.

The discovery that the serum of persons who had undergone an attack of typhoid fever exerted a specific effect on the typhoid bacillus, may be said to have led to the discovery of a method of inoculation against the disease.

The serum reaction is now too well known to call for a detailed account of its phenomena here. It will be sufficient to say that typhoid bacilli were found, when placed in contact with the serum of a typhoid subject, to be visibly affected as follows: The previously motile bacilli became motionless, they adhered to each other in aggregations which were styled "clumps"; these clumps sank to the bottom of the fluid containing them and remained motionless. It was found that the bacilli were not all really dead, inasmuch as if planted out on a suitable nutrient medium, some of them again flourished and multiplied.

Professor A. E. Wright, of the Army Medical School at Netley, took up the subject earnestly and soon made many further discoveries; among others, that the same clumping, agglutinating or sedimenting effect was obtainable with bacilli which had been previously killed by subjection to heat. It was also found that the reaction persisted for years after the attack of fever, in one case as long as twelve years *(British Medical Journal*, January 30th, 1897).

Inasmuch as the specific effect was not obtained with the serum of persons who had not suffered from typhoid fever, it was naturally assumed at once that the reaction was an indication of acquired immunity. Haffkine, in India, had in the meantime begun inoculating against cholera by means of injections of cholera bacilli and their toxines. Professor Pfeiffer, too, had found that the cholera bacillus was agglutinated by the serum of artificially immunised goats.

Artificial Immunity.

Wright now conceived the idea of endeavouring to produce artificial immunity to typhoid by injecting typhoid bacilli and their secreted toxines into the human body. Having so injected them he found that the blood serum of the subjects of injection possessed identical clumping power to that which had been shown to characterise the serum of typhoid fever convalescents. As time went on he found that

this reaction also persisted for a number of years. He concluded that these inoculated persons were now endowed with immunity of the same nature as that known to be the possession of those who had undergone an attack of typhoid disease.

The details of the operation of inoculation are not essential to this article. It is enough to state that the material was injected under the skin and that the following pronounced symptoms ensued: Pain and swelling at the site of inoculation; fainting attacks, vomiting, loss of appetite, diarrhœa (occasionally), shivering, fever and profuse sweating. These symptoms varied in severity in different persons; some, feeling very little discomfort, were able to continue their work and feeding almost as if nothing had happened. The time elapsing between inoculation and the onset of the symptoms also varied. Recovery from the most urgent symptoms was rapid, but a condition of feebleness was apt to remain, some of the inoculated being obviously pale and run down for weeks after the operation. The phenomena in fact were those of a slight attack of typhoid fever.

The originator of the method found some difficulty in getting adequate material on which to experiment with his inoculations. Beginning, however, with himself and staff, he passed on to volunteers—the latter being mostly surgeons-on-probation at Netley. In at least one man besides himself the inoculation of dead bacilli was followed by the injection of living organisms without untoward result. The great obstacle to general acceptance of the system was the severity of the attendant symptoms in the individuals inoculated.

Advantages of Inoculation.

Wright was soon able to produce results which, while too small to be of much statistical value, were distinctly in favour of the advantages of inoculation. The outbreak at Maidstone in 1897, however, provided an opportunity for the production of more definite evidence.[1] The medical officers of the Barming Asylum at Maidstone were confronted with an irruption of enteric in the institution under their care. For obvious reasons they could not adopt, for the protection of the patients committed to their care, what was then regarded by the public as an experimental method. But they resolved to allow the staff of 200 nurses and attendants to have the opportunity of securing any possible advantage from Wright's system—12 cases of enteric had already occurred among the members of this staff. Altogether 84 of the asylum staff were inoculated—none of these got enteric. Of the 116 who declined to be inoculated 4 were attacked by the disease. Here was a markedly favourable record and Wright was encouraged anew. There was still difficulty in getting material to work on, but eventually permission was obtained to inoculate such soldiers as voluntarily offered themselves for the operation, and some troops bound for foreign countries were inoculated.

The prevalence of typhoid fever in the Boer country produced some effect—a good many men and proportionately more officers submitted to the injection of the dead bacillus into their bodies in the hope of so escaping the live one which was making itself so unpleasantly evident. Most of these inoculations were carried out on board ship and the inoculated were landed in the epidemic area before they had fairly got over the operation. In the transport on which I went to South Africa, for instance, we did not begin until near the end of the first week—we waited till we got over the sea-sickness, in fact—and it took us several days to complete them. But the sight of the men first inoculated on a ship was apt to frighten off the remainder and a small proportion only of the troops underwent the operation.

There remained only to patiently wait for news as to how the inoculated fared in the various parts of the world to which they had gone.

Adverse Reports.

Reports adverse to the method now began to be spread abroad. It was even said that instead of being a protection against typhoid the inoculation predisposed to the malady. In certain units of military men, more especially in South Africa, the first to fall sick of typhoid were—according to rumour—the men who had been inoculated. Was this because confidence in their security from infection had caused these men to take no care of themselves as to what they drank or what they did? If not, then what was the explanation?

Colonel A. Crombie, of the Indian Medical Service, was so struck with the results in a large number of officers invalided from South Africa, that he published two accounts thereof in the *Lancet*.[1] He found that of such officers the greater proportion had been inoculated. In the first group the proportion was as 28·5 to 22·0, and in the second group 33·3 to 32·9; the total number of cases dealt with by Colonel Crombie was pretty high, viz., 408. These figures, however, do not convey much information to the statistical mind, for they deal only with sick men, and show no light on the incidence of the disease on inoculated and uninoculated. Moreover, as they referred to the only class which underwent inoculation on a large scale, it is natural to expect large numbers of both inoculated and uninoculated; if the inoculated largely exceeded in strength the uninoculated (I refer to sick and healthy together), there would be nothing striking in the fact that the number of sick in the former class was higher than that in the latter. In the cases reported the excess was not very marked. It might have been argued that the case mortality of the uninoculated was so much higher than that of the inoculated as to account for the prominence of the latter group among the invalided survivors.

Prevalence of Enteric.

As far as mere personal observation during the stress of active military life with a mobile force can be any guide, I formed an opinion that in the force on which fell the brunt of the great epidemic outburst of 1900, around Bloemfontein, almost everybody got enteric. I am convinced that hundreds of cases were never diagnosed as enteric and not even admitted to hospital. This may sound rather improbable, perhaps,

[1] *Public Health*, March, 1898.

[1] *Lancet*, May 3rd, 1902, and August 16th, 1902.

to those who have spent most of their existence in the enjoyment of the comforts of civilisation, but as illustrations of the truth of these remarks I can say that I have known men to go through all the earlier stages of enteric—the malaise, nausea, rigors, fever, diarrhœa, &c.—unaware of their condition, and only come into hospital after increasing weakness and pallor had caused a second person to insist on their seeking medical advice. I have known men to be sent in off guard and other duty, by medical officers who had noticed that they were looking ill, and two or three days later they have died of perforation; again, I have known a man to enjoy a day's shooting within a week before his death from perforation. If these things can be it is quite certain that many cases fail to come under notice. Among the men I speak of were some who smoked, drank, ate, and chatted within a few days of their death. This is a digression from the subject of the article, but the point I want to make is, that inasmuch as in some of the regiments almost everyone had typhoid, old and young, those who had previously suffered from the same disease and those who had not, it would be too much to expect that the inoculated would escape altogether, because they had undergone one small injection of typhoid toxine—been through, in fact, one brief attack of typhoid fever. Wright himself, I am sure, never looked for absolute protection by such simple means. We do not get absolute protection from smallpox by vaccination; neither do we by an attack of smallpox. In fact this rule holds good all round.

With a view to deciding the question in the public mind as to the beneficial results of inoculation—I say the public mind, because I feel certain that the inventor of the method has long been convinced of its utility—Dr. Wright published in the *Lancet*, of September 6th, 1902, a synopsis of such results as he had been able to gather up to that time. He has also, in conjunction with various officers who have assisted him in the practical working out of his ideas, published accounts of elaborate and profound experimental undertakings calculated to throw light upon some subjects connected with inoculation: *e.g.*, the standardisation of the inoculating material,[1] the relation of the agglutinating power to the progress of immunisation in the typhoid patient, as shown by the daily rise and fall, as the case might be, in the degree of this agglutinating effect possessed by typhoid patients till death or recovery; the explanation of the supposed increased liability of some persons to typhoid fever in consequence of inoculation; and the estimation of the bactericidal power of a given blood serum by finding out the number of bacilli killed by it. Some results of these experimental investigations will be referred to later on.

Danger of Inoculation being Neglected.

It had by now become evident to many that the practice of inoculation was in danger of being lost altogether, for two main reasons, viz.: 1st, that the symptoms attendant on the operation were too severe; 2nd, that the medical profession, who ought to be the most qualified to judge, were not by any means unanimously of opinion that the person who had undergone the unpleasant experiences connected with inoculation was one whit better off than those who had not had the courage or inclination to submit to it.

Some suggested that repeated injections of smaller amounts of the vaccine might have the same effect. Others took upon themselves the responsibility of halving the dose recommended (it is interesting to find that the results were not rendered nugatory on this account, some favourable statistics concerning them being included in Wright's synopsis). Nevertheless, the authorised dosage remained the same; those who had got safely through the ordeal being apparently either convinced that it was a trifling matter, or unwilling to let future aspirants to immunity escape their due share of the disagreeables pertaining to the way.

Men who had taken little interest in the subject hitherto, now turned their thoughts to the matter, and wise after the event, perhaps, discovered that it was quite in the natural course of expectation that if you poured bacterial toxines into a man, and promptly followed on with living bacteria, you were giving the microbes an unfair start. Vulgarly speaking, you were hitting the man when he was down. You discharged your blank cartridge into his eyes to blind him, and you then set to work on him with the bayonet. Yet this is what was being done when the men were inoculated on the transports and shortly afterwards landed in South Africa. But, said the bacteriologists, these toxines ought to bring about almost immediate immunisation, we have seen the agglutinating phenomena in the blood two or three days after inoculation! A few, who knew how the vaccine was made, thought that it had been insufficiently heated and was not completely sterile, so that in some cases live bacilli were being injected into the men. Some hygienists, taking the first view, thought that at any rate the results took us a pace or two backwards, confirming the wisdom of our sometimes too little regarded predecessors in their contention that typhoid was brought about by fatigue, privation, &c., in an endemic area. It was not likely that the bacillus had not gained access to other men as well as to those enfeebled by inoculation, yet all did not suffer. Obviously the bacillus typhosus was most dangerous when a helping hand was held out to it.

As a matter of fact it seems that the last mentioned of the critics were right. It will appear further on how their estimate of the situation fits in with bacteriological knowledge, and how it was explained by Professor Wright that the advantages of antityphoid inoculation were not invalidated.

Synopsis of Results.

With regard to Wright's synopsis of results, I shall extract certain parts, some of the items being quite incomparable with others. All the hospitals, for instance, show a great excess of uninoculated cases of typhoid, because very few of the troops were inoculated. The strength of troops from whom these admissions came could not of course be estimated on

[1] The production of the vaccine—if this term of Wright's be admissible—for typhoid inoculation or vaccination, involves a more complicated and delicate process than that for the vaccine against smallpox.

TABLE I.

Unit or Group under observation	Strength, or numbers dealt with		Number of typhoid cases		Percentage incidence		Number of typhoid deaths		Percentage death-rate		Case mortality		Remarks
	Inoculated	Others	Inoculated	Others	Inoculated	Others	Inoculated	Others	Inoculated	Others	Inoculated	Others	
British Army in India, 1899	4,502	25,851	44	657	0·98	2·54	9	146	0·2[1]	0·56	1 in 4·9	1 in 4·5	Extract from Army Medical Annual Report, 1899.
15th Hussars, India, 1899-1900	360	179	2	11	0·55	6·14	1	6	0·27	3·35	1 in 2	1 in 2·2	—
Ladysmith Garrison, 1899-1900	1,705	10,529	35	1,489	2·05	14·14	8	329	0·47	3·12	1 in 4·7	1 in 4·5	—
Garrison of Egypt, 1900	720	2,669	1	68	0·14	2·55	1	10	0·14	0·37	1 in 1	1 in 6·8	—
British Army in India, 1900	5,999	54,554	52	731	0·87	1·69	8	224	0·13	0·58	1 in 6·5	1 in 3·3	Extract from Army Medical Annual Report, 1900.
5th Manchester, 1901-2	200	547	3	23	1·5	4·2	0	7	0	1·3	0 in 3	1 in 3·3	—
C.I.V., 1900	700	494	60	39	8·5	7·9	9	11	1·3	2·2	1 in 6·7	1 in 3·5	—
Richmond Asylum, Dublin	339	298	6	30	1·8	10 0	1	4	0·3	1·3	1 in 6	1 in 7·5	—
7th Hussars, South Africa, 1901-2	307	244	9	20	2·9	8·2	0	3	0	1·2	0 in 9	1 in 6·7	—
Small units	297	398	32	111	—	—	2	18	—	—	—	—	([2])
	17,129	95,763	244	3,179	—	—	39	758	—	—	—	—	—

[1] This figure should apparently be ·19, but the slight error does not affect the report.

[2] Incidentally it may be noted that Wright's table indicates a relatively high rate of attack among hospital employés (figures not reproduced here).

service, the sick came from all parts. I take from the table those items in which strength (the average aggregate number or the population dealt with) is shown as well as the admissions to hospitals. Units with a strength of less than 200 will be shown separately, because individually they are not of much value from the point of view of statistics, I include them, however, in the grand total. With the single exception of the C.I.V., all the rates are in favour of the inoculated.

The percentage death-rate to strength is, however, a more reliable index than the incidence rate—the latter depending much upon diagnosis. The death-rate throughout the table is very much higher in the uninoculated.

The case mortality is of little value, also on account of diagnosis. At home it may be quite proper to call every case of fever over four or five days in duration typhoid, and so improve your mortality returns. In the Tropics and sub-Tropics where fevers are in greater variety this cannot be done. Typhoid fever diagnosed as such in the Army is usually a markedly characteristic case.

Inoculation Enhances Chances of Life.

To show the percentages of the above table at their best it will be as well to work out the totals. We then get the following, which, while not showing such brilliant figures for inoculation as some of the individual items, yet demonstrate that *the chances of life are distinctly enhanced by antityphoid inoculation.* The number of troops dealt with is pretty large—over 100,000—quite enough to make the statistical data reliable.[1]

TABLE II.

	Strength	Percentage, typhoid incidence	Percentage, typhoid death-rate	Remarks
Inoculated ..	15,129	1·6	0·25	—
Uninoculated ..	95,763	3·3	0·79	—

The number of deaths among the uninoculated is quite, and the number of attacks nearly, three times as great as among the inoculated.

In the different hospitals the case mortality varies very much. In some it is on the side of the inoculated, in others in favour of those not inoculated. But, as before said, this is of little account owing to matters of diagnosis.

Practical Value of Inoculation.

We see, then, that beyond doubt a condition of partial or relative immunity may be acquired by the individual who is inoculated with the typhoid vaccine. The following question must now be answered, "What is the practical value of this inoculation?"

First of all let us see what Professor Wright has to say in explanation of the fact that men were attacked soon after inoculation — apparently being rendered specially vulnerable by the inoculation. In a paper on antityphoid inoculation, in the *Lancet* of September 14th, 1902, Wright, alluding to the absence of data as to variation in the effect exerted on the bactericidal power of the organism by excess or deficiency of food, alcohol, chills, fatigue, &c., mentions that he noticed variations in his own bactericidal power, and that

[1] There is also a note on Professor Wright's synoptical table that Major C. Birt, R.A.M.C., from a study of over 500 enteric charts at Harrismith, found that the height of temperature and its duration, the percentage of relapses and the diarrhœa were less in the inoculated than in the others.

some surgeons on probation registered a low power of bactericidal blood effect during the course of the competitive examinations at Netley. It appears also in the paper referred to that the advisability of administering smaller doses of the vaccine had been at last recognised "*with a view to breaking in as little as possible upon recreations and study.*" In consequence, the "*local and constitutional disturbances generally seen after antityphoid inoculation were conspicuously absent,*" a little local tenderness and slight malaise only being experienced. For all that the "personal idiosyncrasy" manifested itself, as some "*were noticeably pale and in less vigorous health for a not inconsiderable period after undergoing the inoculation.*"

The Negative Phase.

The most important discovery announced is the existence in a third of the cases of a "*negative phase*" after inoculation,[1] lasting in one case for at least three weeks, so that after inoculation the man's blood was actually weaker than before the operation, as far as disposing of typhoid bacilli is concerned. In one instance the negative phase was noted after a second inoculation. In another a transient positive phase preceded the negative. There was, moreover, evidence of relation between susceptibility to the typhoid toxins, as demonstrated by severe reaction thereto, and the negative phase. This, of course, is on a par with the infection of the human organism with the living bacillus. Those with little resisting power are more severely attacked than those who possess some natural immunity. The observed bactericidal power of the serum of typhoid patients varies just as does that of the inoculated, who may, as before said, be regarded as suffering from a short attack of typhoid fever. Wright gives an example in the same paper. Of three Netley patients, all very ill indeed with typhoid fever, the most promising, clinically considered, showed practically no bactericidal power—twelve hours later he was dead. The serum of the other two had a decided bactericidal reaction, and these two recovered.

The negative phase in all the inoculations observed eventually gave way to a satisfactory positive phase in which the inoculated evidenced good bactericidal power.

Bactericidal Power of Prepared Serum.

We may take it that a very slight bactericidal effect noted in serum outside the body, and considerably diluted, indicates a much greater bactericidal influence in the living circulating serum. That is to say, if a drop of typhoid culture can be almost sterilised by its own volume of serum, the small quantity of bacilli which may be assumed to enter the body at the first onset in a natural infection ought to be easily dealt with by the whole, relatively enormous, volume of serum in the human body. It has, however, been suggested that the bactericidal power shown to be present in the artificially separated serum does not necessarily exist in the circulating blood—a view which Prof. Wright evidently thinks worth considering. But it seems to me that the evidence is good enough. The bactericidal power must mean some alteration in the blood constituents, born of resistance to typhoid poisoning. Whether the power exists inside the body in exactly the same form as it does outside seems to be of little or no practical moment, provided it *does* exist.

Dr. Wright then proceeds, in spite of the discovery of the "negative phase," to throw doubt upon the existence of a state of increased susceptibility to typhoid infection, or diminished power of resistance to the disease when contracted (which seems to be one and the same thing), after inoculation. He suggests that the fevers were contracted before inoculation; also that when they terminate fatally it may be owing to a more than usually virulent infection. But on his own showing a little further on—in the case of the 3rd Hussars in India—the evidence is as clear as any such testimony can be. He inoculated half the regiment during an epidemic. Within nineteen days five of these men had typhoid, whereas none of the other (the non-inoculated) half had the disease. No explanation is offered as an alternative to the one that the victims were temporarily lowered in resistance by the inoculation. In the case of South Africa, too, where the men were inoculated outside the epidemic area and shortly afterwards disembarked in what was a hot-bed of typhoid, it is fair to assume that the infection was contracted in South Africa as a rule, withal a few cases have occurred on transports. The inoculated and uninoculated were under the same influences throughout and, though nothing is impossible, it is at least unlikely that the infection before landing would fall mainly on the inoculated, unless, indeed, for the same reason that we assume it fell on them after they had landed. The medical officers who reported the cases in which inoculation was a predisponent to fever were for all that in favour of inoculation. However, as we gather further on, the Professor was evidently only throwing these doubts in his path in order to have the pleasure of kicking them aside.

It is established, then, that *inoculation against typhoid should, in order to reap the utmost limit of benefit, be carried out some weeks or months—probably two or three months, to be quite safe—before the inoculated are subjected to danger of infection.*

Inoculation of Enteric Patients.

As to the effect of inoculating a person who has already contracted fever: when the typhoid bacillus has begun to secrete toxins in the blood it is bound to be aided in its efforts if toxins of the same nature from another source are thrown in to assist it. That is a risk which must be run by any person who undergoes inoculation. But it can never be proposed to sacrifice the interests of a community to that of an individual. *Let us now see how the anti-typhoid results compare with vaccination against smallpox.*

In the Sheffield epidemic of 1887-8 the percentage attacked at all ages in invaded houses was as follows:—

Vaccinated.	Unvaccinated.
23	75

and the death-rate—

Vaccinated.	Unvaccinated.
1·1	37·2

[1] Improved technique had enabled the investigators to estimate more accurately than before the variations in comparative bactericidal power of sera.

The invaded houses may be taken to roughly resemble the condition of the epidemic areas and the invaded establishments (asylums, &c.) shown in Wright's table. The protection from attack was not much greater than that afforded by anti-typhoid inoculation. If we take the asylums as being more strictly comparable to invaded houses, we find that in the Richmond asylum the uninoculated were more than five times as liable to attack as the inoculated—a more favourable result than in the Sheffield epidemic of smallpox. The Barming asylum is even more favourable to the anti-typhoid vaccine, but the numbers dealt with are small. The death-rates, however, are immensely in favour of the vaccination from smallpox, both as to the general result and as to the asylum returns, being in the proportion 33 to 1 for the smallpox, whereas for the typhoid it is only 4 to 1.

In Seaton and Buchanans' school census it was recorded that 36 per cent. of unvaccinated children bore marks of smallpox, whereas only 1·42 per cent. of those with three vaccination scars had such marks. Even among those with one vaccination mark, only 6·8 per cent. showed smallpox marks.

Enough has been said to show that vaccination for smallpox is a vastly superior protective measure to that of anti-typhoid inoculation in its present stage of development.

Moreover, the danger to the community generally from typhoid fever is as nothing compared with that from smallpox before the introduction of Jenner's method of vaccination. We hope, most of us, to go through life without suffering from typhoid, even if we are not inoculated. In fact we are still in some places, in spite of universal vaccination and revaccination, nearly as subject to smallpox as to typhoid fever; see, for instance, Supplement to the Registrar-General's Fifty-fifth Report. Death-rate per 1,000, London (males), decennium 1881-90; smallpox, ·13; typhoid fever, ·20. For the whole population for the same period the annual typhoid fever mortality per 1,000,000 is only about four times that of smallpox, and in the ten years before that (1871-80) it was not twice as much.

Liability of Soldiers to Enteric.

With respect to the soldiers, however, the case is somewhat different. His duties take him to countries where he is very much in the way of typhoid fever, more especially in time of war. The malady may be looked upon as the principal scourge of modern armies in the field. We have had a lamentable enough example of this in the recent campaign in South Africa. The disease is also a very serious thing in military life abroad in time of peace. For instance, to take the first report which comes to hand—Army Medical Report (Annual), 1898—we see that in 1898 in India there were 36 typhoid admissions and 10 typhoid deaths per 1,000 of strength; while in one large station the average for the ten years 1888-97 is shown at 21·8 and 5·75. In Quetta the admission and death-rates per 1,000 per annum for typhoid were respectively 108 and 35—very high rates indeed. In the Khyber force and brigade *the rates were even higher, viz.*, 160·5 *and* 40·46. In the Malakand force only 95·4 and 31·81. In Peshawar, 56·6 and 22·07. *The actual number of typhoid deaths in the British Army in India in* 1898 *was* 654. In South Africa during the same period—when we were not at war—the rates per 1,000 were, admissions 32·9, deaths 5·77. In Bermuda the rates were 15 and 2·31 respectively, with a ten-yearly average of 34·8 and 6·28. In Egypt (partly on service), 81·0 and 23·40. In Malta, 21·2 and 6·28. In Gibraltar, 4·2 and 1·32. These are among the worst stations for the period dealt with, but the disease is represented year by year in most places where soldiers serve. Compare some of the above with the home figures. England, 2·0 and ·28; Scotland, ·3 and ·00; Ireland, 1·6 and ·09. United Kingdom, 1·9 and ·22, with a ten-yearly average of 1·2 admissions and ·24 deaths from typhoid per 1,000. So much for the army at home. Look at the total rates (civilians included). The death-rate per 1,000 among males in England and Wales during the decennium 1881-90 from typhoid was ·21 per 1,000; this includes children. During the same period (Registrar-General's Fifty-fifth Report) the deaths from all causes among men between 20 and 25 were only 7·73. So in Quetta, a permanent station, among well-fed men, the deaths from typhoid fever alone were proportionately nearly five times as many as the total deaths in England and Wales among males of similar age, but of all classes—rich and poor—the normally built and the deformed. In the Khyber the disproportion was even greater.

A Brief Résumé.

(1) Antityphoid inoculation has a distinct value in protecting the human organism from attacks of typhoid fever.

(2) To obtain the fullest measure of protection the operation should be done, say two months before exposure to infection.

(3) Even when inoculation is performed shortly before exposure to infection it is a beneficial procedure on the whole.

(4) The protective influence is exerted for some years, long enough probably to tide over the most vulnerable age of youth and earlier manhood.

(5) The protection afforded is in the proportion of 3 to 1.

(6) The proportion of protection is much less than that of efficient vaccination for smallpox.

(7) Vaccination against smallpox is about ten times as effective as antityphoid inoculation.

(8) Typhoid under normal conditions at home and in some foreign stations is not a very common disease, such as smallpox used to be.

(9) Typhoid among soldiers—on active service in most places, and when on peace service abroad, especially in India, South Africa, Egypt, Bermuda, Mauritius and Malta—is a very common and fatal disorder.

(10) Typhoid is a danger to which nurses and hospital subordinates generally are specially exposed.

Conclusions.

The *final conclusions come to as regards the practical value of antityphoid inoculation* are :—

(1) That it is not at present of sufficient practical value to warrant its general adoption by the nation at large.

(2) That it is of distinct practical value to any community in which typhoid breaks out in an epidemic form.

(3) That it is of practical value to those who have much to do with typhoid patients.

(4) That it is of utility for general adoption among new-comers in certain special endemic areas abroad, such as some Indian stations and Malta.

(5) That it is of great practical value at all times to soldiers serving in India, South Africa, and Malta; also, but in a less marked degree, in Gibraltar and other places.

(6) That it is certainly of the greatest practical value to soldiers about to take the field in any tropical or sub-tropical country where typhoid is known to prevail.

To this last the writer would add that he believes typhoid would be an important factor to be reckoned with also in a campaign at home or in any European country, though we have not had recent experience to guide us in this matter. He is therefore of opinion that antityphoid inoculation is of practical value to armies about to take the field in Europe.

After the above article had been sent in, Dr. Wright published further reports (see *British Medical Journal*, October 10th, 1903), from which is extracted the following:—

British Army in India, 1901.
(*Extract from Army Medical Report*, 1902.)

	Attack rate per cent.	Death-rate per cent.
Inoculated	0·66	0·06
Uninoculated	1·33	0·36

Dr. Wright also notes a report by Surgeon-General Sir Ed. Townsend, K.C.B., C.M.G., that the attack rate per cent. in Lord Methuen's column from December, 1899, to March, 1900, was 1·0 and 2·3 for inoculated and uninoculated respectively.

These figures do not necessitate alteration in the views expressed in the article.

Hyperidrosis Pedum.

Weiss, L. Hyperidrosis Pedum and its Treatment, by Baths of Permanganate of Potash, *Journal American Association*, 1904, August 6.—The signs and symptom of this troublesome ailment, excessive sweating of the feet, are well known, Weiss recommends thorough washing of the feet with borax water and soap, and then soaking for fifteen minutes in an ankle-deep solution of permanganate of potassium, 60 grs. to a pint of water, at a temperature of 104° F. before going to bed. On the following morning the foot is slightly dusted with the following powder: Potassii permanganatis, 13·0; aluminis, 1·0; talci, 50·0; zinci oxydi, lapidis calaminaris, āā 18·0. The interphalangeal spaces must also be dusted and separated with absorbent cotton. Daily change of stockings and shoes is desirable. The average duration of the treatment is two weeks.

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THE
Journal of Tropical Medicine
September 1, 1904.

THE SECTION OF TROPICAL DISEASES AT OXFORD.

The Section of Tropical Diseases at the meeting of the British Medical Association at Oxford in July was well attended, and the papers and discussions maintained the high level of excellence to which we have become accustomed at the meetings of this Section. This is the eighth consecutive meeting at which tropical diseases have had a separate section, and although, on at least two occasions, it seemed doubtful if the Section would be allowed to meet, we hope no such interruption will threaten in the future. The cause for the threatened omission of the Section was merely apathy on the part of the local committees. It is part and parcel of the despicable parochialism which affects British folk as a canker that dictated the idea that tropical ailments did not concern them. They forget that their countrymen who have gone abroad to pioneer and to uphold the flag under which they find shelter,

and to maintain the commerce by which home markets are supplied, are subject to many virulent diseases which the home-dwelling physician has never even heard the names of, far less studied. The fact that over a million British subjects die yearly of plague; that commerce is crippled and men ruined by outbreaks of beri-beri in plantations or on ships; that sleeping sickness kills everyone attacked; all these scourges seem incapable of exciting even the humanitarian instinct we are wont to associate with medical men, not to mention the scientific interest attaching; and they tolerate the Section of Tropical Diseases as an adjunct that may be lopped off by any local committee having to do with the arrangements for the year.

It may be confidently asserted, and without wishing to in anyway detract from the valuable work done at other sections, or by other societies, that the announcements made in tropical medicine since the first meeting held in Edinburgh, in 1897, have in their permanent scientific value been unsurpassed in any branch of science. At the first meeting in Edinburgh, Sir Patrick Manson announced Major Ross's work in India, and gave to the world a scientific fact which in its range of usefulness, and in its bearing upon the investigation of the part played by insects and other animals in causing disease in human beings, has illimitable possibilities for good. At another meeting the fact was announced that yellow fever was conveyed by mosquitoes, and that by eradicating mosquitoes from Havannah the disease which had caused the city to be looked upon as a pestilential den had been swept away.

In 1903 Castellani laid before the Section the information that a trypanosome had been found in the cerebro-spinal fluid of sleeping sickness patients; and Forde and Dutton demonstrated trypanosomiasis in man for the first time. In 1904 Bruce declared his belief that sleeping sickness was caused by the bite of the tsetse fly; Leishman related his discoveries in connection with the Leishman-Donovan bodies, and Rogers communicated the fact that these bodies had been seen to develop into trypanosomes. These are some of the subject matters dealt with by the Section, a Section threatened with extinction on more occasions than one; and the fact admits of a parody on the well-known legend, which might be interpreted thus: "What do they know of disease who only British diseases know?"

PLAGUE IN INDIA, JANUARY TO JUNE, 1904.

DEATHS from plague in India during the first six months of 1904, showing total and weekly returns:—

Week ending		
(January	1—2)	4,286
,,	9	17,344
,,	16	21,302
,,	23	21,103
,,	30	23,203
February	6	24,204
,,	13	25,630
,,	20	26,537
,,	27	27,858
March	5	28,919
,,	12	33,517
,,	19	40,527
,,	26	39,975
April	2	46,320
,,	9	47,759
,,	16	46,812
,,	23	38,748
,,	30	44,783
May	7	41,607
,,	14	35,413
,,	21	28,219
,,	28	20,484
June	4	13,770
,,	11	7,762
,,	18	5,929
,,	25	2,873
July	2	2,688
,,	9	1,910
,,	16	1,995
,,	23	2,683
,,	30	3,192
(,,	31)	430
		725,631

From January 1st to July 31st, 1903, the deaths from plague in India amounted to 533,565, showing an increase in deaths from plague during the first six months of 1904 of 192,066 as compared with 1903.

Chromatophores—Melanin.

LOEB, L. The Character of Chromatophores, *Journal of American Medical Association*, 1904, July 23.—The pigment of chromatophores, according to Loeb, originates in the epidermis and that the production of melanin is a peculiarity of certain epithelial cells which is preserved after transplantation to localities where only non-pigmented cells exist. It is not unlikely that the pigment itself is due to an oxidation and condensation.

Royal Institute of Public Health.

FOLKESTONE CONGRESS, JULY, 1904.—SECTION, TROPICAL DISEASES.

Thursday, July 21.

Presidential Address.

By W. J. Simpson, M.D., M.R.C.P.

Professor of Hygiene in King's College, London; Lecturer on Tropical Hygiene, London School of Tropical Medicine.

Abstract.

Preventive Work in the Tropics.

The history of preventive medicine in the Tropics, so far as the British Possessions are concerned, is similar to that of Great Britain, but differs in being many chapters behind. To a limited extent the practice of preventive medicine in the Tropics has been based on the results of general observations and experience on the spot, guided by the tenets which have held sway in England, the underlying principle of which is that cleanliness in its widest sense is the chief sanitary law. It is a good foundation to work upon, and if later discoveries show that it does not cover the whole field of preventive medicine, there can be little doubt it includes a very large portion.

The Need of a Special Sanitary Service for India.

If the scheme which I drew out in 1894, after consultation with some seventy civil surgeons over different parts of India, and which brought into requisition a trained sanitary service of Indian medical men, supervised by Europeans, had been carried out, India would probably have been in a different plight from what it is to-day. The scheme was accepted by the Indian Medical Congress in the form of a resolution to the Government of India with a view to its practical adoption, and later it was accepted by the Government of India. Evidently it has never been put into practice, for we find that in 1901 the Plague Commission recommends a similar scheme to mitigate the ravages of plague. In view of the engrossing and multifarious nature of their other duties, it does not appear possible for civil surgeons even to inform themselves of the sanitary requirements of their extensive districts, much less to supervise or direct sanitary affairs in them.

In this connection I shall refer to some further experiments which it is proposed to carry out against the mosquito in India. They are to be made in certain selected municipalities in the Central Provinces, where the Sanitary Commissioner evidently takes a great interest in the subject. The civil surgeon is to supervise the work, and civil surgeons in general have been instructed to make search from time to time in all municipal towns in their respective districts for the breeding places of malarial carrying mosquitoes, and on the discovery of these to take such remedial action as may be possible in communication with the Deputy Commissioners and the President of the municipalities, a note of the action taken and its results being made in their annual sanitary report. This is excellent, and shows that the Sanitary Commissioner thoroughly appreciates the importance of Ross and Manson's work; but without wishing to damp the ardour of those interested in the experiment, I hope that it will not be made, because, unless an experiment of this kind is made under the best conditions, it is apt to do harm to the cause.

Ten years ago, in 1894, at the Indian Medical Congress held in Calcutta, when advocating the need of a separate sanitary service for India, I showed that the civil surgeon was overworked, being overwhelmed with his professional duties, which often included those of the hospital and gaol, and that, though he was *ex-officio* a health officer, he had neither the time to devote to sanitary work nor the power to enforce his recommendations, and that the Sanitary Commissioners who did devote their whole time to the duties were so few in number as to be unable to exercise any control or influence over epidemic disease.

Is it not time that further representations should be made on this subject? Lord Curzon has the interests of India most closely at heart, and he possesses the power and energy to carry out a great reform. Might not the Royal Institute of Public Health approach the Viceroy of India on this important subject? However difficult the task may be, the duty and responsibility of this country towards India and the welfare of its people demand that everything that science can accomplish shall be done to prevent the havoc that is being caused by the prevalence of plague. It is now eight years since plague reached India, and it is worse to-day than it ever was. Nearly 1,000,000 died of it last year.

In order not to be misunderstood, and to avoid the impression that credit is not given where credit is due, I would point out the great work which the Government of India has done in the campaign of plague, the large amount of money it has expended on plague measures, and the strenuous efforts it has made with the material it possesses to control the disease. These efforts, under the circumstances, without a trained executive, were, however, doomed to failure, a result which could have been easily anticipated.

I hope the Royal Institute of Public Health will not be content with passing resolutions at its different congresses, and then forgetting them. Discussed and passed by men interested in the welfare and commerce of West Africa, they would, I am sure, be received sympathetically by those in authority, who have always shown interest in the welfare of those under their charge, but whose difficulty no doubt at first will be ways and means. It is not in West Africa alone, however, that we need such a service. We need, as I stated in my address at Aberdeen in 1900, an Imperial or Colonial Sanitary Service. Towards the furtherance of a sanitary service of this kind the establishment of the schools of tropical medicine and hygiene in London was the first step. It renders the creation of such a service possible.

With the necessary adjustment for local circumstances, a sanitary organisation should be extended to all our tropical colonies that are in an advanced and settled condition. If this organisation were supplemented at the Colonial Office by an Advisory Board, having the present distinguished medical

adviser as its president, whose duties it would be to read the sanitary reports and advise the Government on the many problems which arise in connection with health matters, we should be on a fair way to being in a position to apply, in a systematic and scientific manner, practical measures, based on the discoveries in malaria and other tropical diseases, for their prevention.

Clinical Notes.

THE BABINSKI SIGN.—To examine for the Babinski sign, place the patient in bed on the back and slightly inclined towards the side to be examined. Flex the leg on the thigh and the thigh on the abdomen, each at an angle of 45°. In this position the muscles are relaxed and the foot to be examined lies on its outside. Grasp the dorsum of the foot in one hand, and with a quill, key, pin, or pencil, &c., in the other stimulate the plantar surface. Use at first light stimulation. Examine especially the outer part of the plantar surface and the ball of the great toe. Remember that when the feet are cold and damp, and after the patient has been standing for any time, the plantar reflex is often absent; and therefore it is advisable, if no response is obtained, to examine the patient in bed. A single movement of extension, provided that it is undoubtedly reflex, is of the greatest significance, even if on further stimulation movements of flexion are alone obtained.

Clinical Significance.—An extensor response is present in the great majority of infants, perhaps all.

In "healthy" persons after the first year of life, the plantar reflex is always flexion, *i.e.*, a Babinski sign is never met with.

The Babinski sign means implication of the upper motor neurons by organic disease. Exceptions to this statement are: (*a*) the infantile response; (*b*) the extensor response, which occurs after an epileptic convulsion; (*c*) the extensor response, which has been described in strychnine poisoning and in tetanus.

The Babinski sign is an extremely delicate indicator of an organic affection of the upper motor neurons.

Absence of the Babinski sign does not necessarily exclude organic disease of the upper motor neurons, for in some cases of old-standing hemiplegia, &c., the response is of the flexor type.

The Babinski sign probably never occurs in a case of hysteria uncomplicated by organic disease.—Dr. E. Bramwell, *The Scottish Medical and Surgical Journal*, August, 1904.

Drugs and Remedies.

THIOCOL, referred to by Dr. Strachan as a substitute for quinine in his paper read before the British Medical Association at Oxford, and noted at page 256 of the JOURNAL OF TROPICAL MEDICINE of August 15th, 1904, can be given in doses from 10 to 30 grains thrice daily. It may be prescribed in powder or aqueous solution. When in solution the taste is covered by syrup of orange.

PRURITUS.

The ever-annoying pruritus accompanying icterus is best allayed by cold sponging, 2 per cent. carbolic acid solution, or rubbing the skin with lemon slices.

℞ Mentholi .. .. .. 2·5 (45 grs.).
Lani,
Petrolati, āā .. .. .. 30 (1 oz.).
Mf. ung. Rub in frequently. (For itching.)

℞ Acidi phenylici .. .. .. 5 (45 grs.).
Aceti aromatici, ad. .. .. 240 (8 ozs.).
Externally. (For itching.)

℞ Ichthyoli .. .. .. 6 (1½ drs.).
Spiritus,
Ætheris, āā .. .. .. 30 (1 oz.).
Externally. (For itching.)

—BJORKMAN, G., *Merck's Archives*, August, 1904.

Notes and News.

SIR WILLIAM MCGREGOR, K.C.M.G., M.D., LL.D., has been appointed Governor and Commander-in-Chief of Newfoundland.

TROPICAL DISEASES AND SANITATION IN INDIA.—At the Health Congress, which was held at Folkestone this year and closed its sittings on Tuesday, the Tropical Medicine Section attracted a great deal of interest. The president of the section was Professor W. J. Simpson, M.D., of King's College, who gave an address on "Preventive Work in Tropical Medicine," and dwelt at length on the question of sanitary organisation, which, he said, was so much needed in the Tropics, not only against malaria, but also against other diseases. Subsequently, by special request, Mr. Cantlie, M.B., spoke on "beri-beri." He described in detail the geographical distribution and treatment of the disease, which he supplemented by giving its signs, symptoms and causes. In the past, Mr. Cantlie affirmed, no attention had been paid to beri-beri, but at the present time a dozen cases could be produced in London. It was, he thought, peculiar how diseases became fashionable, and to-day beri-beri seemed to be fashionable. People who had money invested in South Africa were interesting themselves in it, and he rejoiced, for the sake of the Empire, that at last notice had been taken of one of its greatest scourges. Mr. Cantlie explained the different types of the disease, and mentioned places where it had largely existed, though under other names. We do not object to beri-beri being a fashionable disease, if the result is the mitigation of the malady; but mere chatter about its origin, its progress, and its character in West End drawing rooms will not do much in that direction. We are glad to see that the proceedings of the Tropical Medical Section did not end with talk. A resolution was passed urging the Council of the Royal Institute of Public Health to approach the Secretary of State for India, and the Viceroy, for the purpose of laying before them the importance of a large-increased special sanitary service for India. If this recommendation is acted upon, some practical result may be the outcome of their deliberations. As Lord Curzon is now in England, it would be easy for the Secretary of State to confer with him on the

subject, and if a weighty representation is made of the needs of the case, it is not perhaps too much to hope that a service which notoriously needs strengthening will be augmented and rendered more efficient. —*The Hospital*, July 30th, 1904.

THE MALTA FEVER COMMISSION.—The Commission appointed by the Royal Society to investigate the etiology and pathology of Malta fever consists of Col. David Bruce, F.R.S., R.A.M.C., Major Horrocks, R.A.M.C., Staff-Surgeon Shaw, R.N., Dr. Zammit, Chemical Analyst and Bacteriologist to the Government of Malta, and Dr. Ralph Johnstone, of the Local Government Board. The services of Captain Kennedy, R.A.M.C., and Surgeon Gilmour, R.N., are also available to the Commission. The cost of the Commission will be defrayed jointly by the Admiralty, the War Office and the Government of Malta. The Royal Society has contributed £200 for apparatus from the grant it receives from Government. The work of the Commission will be watched with keen interest not only by scientists, but by our soldiers and sailors, for Malta fever causes them to dread service in Mediterranean. The specific microbe—the *Micrococcus melitensis*—of the disease has been known for some ten years, but no advance has been made since then in regard to the mode of transmission, the treatment, or prophylaxis of the fever.

Colonial Reports.

Trinidad and Tobago, West Indies.

REPORT OF THE SURGEON-GENERAL JAMES A. DE WOLF FOR 1903-4.—The report was laid before the Legislative Council on July 4th, 1904.

The population of Trinidad and Tobago, March 31st, 1904, was 304,860, showing an increase during the twelve months of 7,871.

Malaria.—In the Colonial and District Hospitals, 1,251 cases of the benign type occurred and 119 of the malignant type.

Hæmoglobinuric Fever.—Three in Tobago, and one in Trinidad, the last probably contracted in Venezuela.

Varialoid Varicella.—5,256 cases; 28 deaths, or a case mortality of ·54 per cent.

Tuberculosis.—Decided increase in all towns and districts.

Yaws.—In Trinidad, during the twelve months, 1,032 were treated; a marked increase, probably due to more thorough investigation. In Tobago a marked decrease occurred, from 396 on March 31st, 1903, to 173, March 31st, 1904.

Ankylostomiasis and Anæmia show a total of 1,697. The prevalence of anæmia is undoubtedly to be attributed to the ankylostoma parasite. The condition is one which seriously affects the working strength of the estates, leading to general deterioration of health of those affected by it, and rendering them very susceptible to other diseases. It is probable that the disease is usually contracted by working in fields where the ground is polluted with human excreta. As yet it has not been found possible to avoid this source of infection, owing to the strong repugnance of the Indian immigrants to making use of latrines. It is undoubtedly a fact that the disease is sometimes communicated through the medium of drinking water. This seems to have been well illustrated in the case of two estates in the Arima district, La Chaguaramas and La Reunion. These estates belong to the same proprietor and the immigrants of both estates are treated in the hospital at La Reunion. The water supply at La Reunion is derived from a spring, while that of La Chaguaramas was formerly taken from the Caroni River. The health of the immigrants on the former estate has been remarkably good, whilst at La Chaguaramas ankylostomiasis prevailed to an alarming degree. Analysis showed that the water from the spring was of an exceptionally pure quality, whilst that from the river was reported as containing a large proportion of organic impurities.

Infantile Mortality in Port-of-Spain is excessive. The majority of deaths occur during the first three months of life. During the first month of life, deaths are mainly attributable to congenital defects, and maternal ignorance or carelessness. In the succeeding months the chief cause of death is diarrhœal diseases, the result of improper and careless feeding.

In the Colonial Hospital, San Fernando Hospital, and District and Yaws Hospitals, the following diseases were met with and treated :—

	Cases.	Deaths.
Enteric fever	112	5
Beri-beri (Kakke)	8	0
Malarial cachexia	100	5
Filariasis	3	2
Elephantiasis	34	2
Leprosy	29	0
Yaws	1,164	0
Eye diseases	309	0
Ear diseases	17	0
Dysentery—		
(1) Acute	198	73
(2) Chronic	68	23
Diarrhœa—		
(1) Acute	223	60
(2) Chronic	193	61
Abscess of liver	8	6
Vesical calculus	1	0

Malignant Diseases.—In the list of general diseases the malignant growths are enumerated as :—

	Cases.	Deaths.
(1) Cancer	10	3
(2) Epithelioma	10	1
(3) Sarcoma	2	1

Twenty-three cases in all, yet on analysing the list we find the malignant diseases under the various organs stated thus :—

	Cases.	Deaths.
Lung—carcinoma	1	1
Tongue—cancer	3	0
Stomach—cancer	8	3
Pylorus—cancer	2	2
Liver—cancer	7	6
Penis—epithelioma	3	1
Testicle—malignant disease	1	1
Uterus -cancer	23	10
Breast—scirrhus	14	1

Sixty-two cases in all. Are we to understand there were 62 cases or only 23?

Eruptive Fever.—An anomalous ailment termed "Eruptive Fever" is described as occurring in the St. Ann's Lunatic Asylum, Trinidad, by Dr. G. S.

Sercombe, the Medical Superintendent: "From June to October we had 31 cases of 'eruptive fever' amongst our inmates, all confined to the female side of the Institution. As far as possible these cases were isolated. There was little or no constitutional disturbance, and in many cases hardly any rise of temperature, though the eruption was profuse. There were no deaths from this disease." More precise information concerning this ill-defined illness is required and a closer investigation desirable.

Scarlet Fever and Acute Rheumatism seem the only prominent ailments not mentioned in the lists of diseases. In regard to rheumatism, only sub-acute and chronic rheumatism are mentioned, yet organic cardiac lesions seem prevalent.

Shanghai.

Annual Report of Shanghai Health Department for 1903. By Arthur Stanley, M.D.Lond., Health Officer. The Report of the Medical Officer of Health for Shanghai, always a model in its way, is rendered additionally interesting by two articles in the Appendix, entitled, "On Sudden Heart Failure in Toxæmic Conditions, with Special Reference to Diphtheria and Beri-beri," and "Chinese Hygiene," both by Dr. Stanley.

A public health notice issued by Dr. Stanley, is well worthy of imitation.

The following measures are recommended by the Health Officer, Dr. Stanley, for the purpose of preventing those diseases which by means of individual careful living and by public sanitation are preventable, such as typhoid fever, cholera, dysentery, diarrhœa, smallpox, scarlet fever, diphtheria, tuberculosis, plague, malaria and others:—

Public Measures.

Sanitary Inspection of houses will be carried out free of charge by the Health Department on application to the Health Officer.

Nuisances dangerous to health should be reported to the Health Officer.

Disinfection of premises after infectious disease will be carried out by the Health Department free of charge on application to the Health Officer.

Individual Measures.

Vegetables and Fruit grown near the ground, being liable to infection with typhoid fever, cholera and diarrhœa, should be strictly separated from the rest of the food before cooking. Cooking destroys the infective material. Uncooked vegetables and fruit should not be eaten unless it is known that they are grown clean.

Milk should be thoroughly boiled immediately it is received.

Water for drinking or kitchen purposes should be either boiled or filtered through a Berkefeld or Pasteur filter. All other filters are worse than useless. Water should not be stored in any vessel, but drawn straight from the tap.

Kitchen supervision should be personal and daily, and should be directed especially to the soundness of food before cooking, the ice chest, and general cleanliness. Food utensils should be scalded thoroughly and scrupulously clean, boiled dish-cloths used.

Mosquitoes and Flies carry disease, hence fly-covers should be used over cooked food. As mosquito bites may be infective, the mosquito net should not be neglected. A small quantity of paraffin oil thrown into stagnant water will prevent the development of mosquitoes.

Refuse should not be allowed to accumulate, and nightsoil buckets should be kept securely closed, including those in the Chinese servants' latrines.

Yards and Drains should be freely flushed with water. A good and cheap disinfectant is crude Jeyes' fluid, which may be added in the proportion of a teacupful to a gallon of water. This may be sprinkled freely over any surface requiring disinfection, subsequent to the flushing with water, but it is useless to pour disinfectant directly down drains. Drains can only be disinfected by keeping them in a good state of repair and flushing freely with plain water.

Vaccination should be repeated every five years.

Vital Statistics.

The foreign and the Chinese populations of Shanghai for the middle of 1903 amounted to 8,300 and 375,000 respectively. The deaths amongst the resident (six months' residence) foreign population during the year 1903 amounted to 132, or 15·9 per 1,000 per annum. Amongst the Chinese 7,956 deaths occurred, or 21·2 per 1,000.

I.—Meteorology of Shanghai, 1903.

——		First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year 1903
Barometer	Mean Inches	30·26	29·88	29·79	30·21	30·03
	Departure from Average	—0·00	+0·01	+0 01	—0·01	+0·00
Temperature	Mean Degree	41·2	64·0	77·8	53·1	59·0
	Departure from Average	+0·2	—1·1	—0·0	+0·6	—0·1
Daily Range of Temperature	Mean Degree	14·8	15·1	14·8	18·7	15·9
	Departure from Average	+1·5	—1·5	—1 0	+2·3	+0·3
Degree of Humidity	Mean (Saturation—100)	79	79	82	72	78
	Departure from Average	+1	+1	+2	- 4	0
Rainfall	Amount in Inches	7·99	18·03	14·71	2·03	42·76
	Departure from Average	+0·35	+ 20	—1·04	4·21	—0·70

The above figures were furnished by Father Froc, Director of the Zi-ka-wei Observatory.

Deaths from infectious diseases amongst the resident population during 1903 were as follows:—

	Smallpox	Cholera	Typhoid Fever	Diphtheria	Scarlet Fever	Tuberculosis
Chinese	241	162	0	3	2	1,976
Non-Chinese ..	7	6	13	0	1	26

Plague has not appeared in Shanghai, and a very careful watch is being kept on the ships coming from plague-stricken ports.

Malaria caused no death during the year. Amongst the foreign population malarial fever is common enough, but mostly of the benign tertian type. Of 4,000 mosquitoes caught, two varieties of the malaria-mosquitoes met with locally—the *Anopheles sinensis*—were found.

In the Public Health Laboratory a great deal of useful work, both practical and scientific, has been carried out. The medical men in Shanghai and several of the outposts avail themselves largely of the clinical opportunities afforded by the laboratory.

Glycerinated smallpox vaccine has been sent out to the extent of 12,000 tubes, and as each tube is sufficient wherewith to vaccinate five persons, a considerable amount of local protection has been afforded.

Haffkine's plague prophylactic has been sent out from the laboratory to the extent of 615 doses. Mallein and tuberculin have also been issued to a small extent.

Of diphtheria antitoxin, 540,000 units have been supplied to applicants.

Since the opening of the Pasteur Institute in 1889 no fewer than 135 persons have received treatment. During 1903 as many as 47 persons were treated.

Colonial Appointments.

Dr. J. H. Conyers, Assistant Resident Surgeon of the Public Hospital, Georgetown, British Guiana has been granted leave of absence.

Dr. J. F. S. Fowler is acting as Assistant Resident Surgeon of the Public Hospital, Georgetown, British Guiana, during the absence on leave of Dr. J. H. Conyers.

Dr. J. E. Godfrey, Surgeon-General of British Guiana, has been made an Official Member of the Court of Policy, in place of the late Sir David P. Ross, as well as Registrar-General of Births and Deaths.

Dr. J. Pringle is acting as Superintending Medical Officer of Jamaica in succession to Colonel W. W. Kenny, of the Royal Army Medical Corps, and pending the appointment of a successor to Deputy-Surgeon-General C. B. Mosse.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Philippine Islands.

Report of the Superintendent of Government Laboratories for the Year ending September 1, 1903. Pp. 622.

A great deal of useful work has been done in the laboratories for investigation and production of sera in the Philippines. The chief laboratories are the Serum Laboratory, the Chemical, Biological, Entomological, Botanical, the Laboratory of Weights and Measures, and the Marine Biological Laboratory.

Owing to the prevalence of rinderpest in cattle, great attention has been paid to preventive measures and to immunisation, as well as to serum treatment. The Chemical Laboratory attaches great interest to gutta-percha and rubber, and valuable work in the natural history of these substances has been accomplished.

A full investigation into Surra, the trypanosomal disease in cattle met with in the Philippines, has been made by Dr. W. E. Musgrave and M. T. Clegg. The report is profusely illustrated by excellent photographs.

Trypanosomiasis—Nomenclature.

A list of the various names used to designate trypanosomiasis in different parts of the world has been compiled from literature as follows:—

Adjoe.
Andar-tap.
Anémie pernicieuse.
Berbad.
Beschalkrankheit.
Beschalseuche.
Blaschemausschlag.
Bovine surra.
Buffalo surra.
Camel surra.
Canine surra.
Dog surra.
Doaia.
Dourine.
Equine relapsing fever.
Equine surra.
Equine syphilis.
Exantheme coitale.
Fish surra.
Flagellose de equins.
Galtah.
Galtia.
Glossinose.
Horse pox.
Horse surra.
Juckkrankheit.
Khanbog.
Khusk-zaharbad.
La mouche.
Leuma equorum.
Mal de caderas
Maladie á trypanosome.
Maladie benigne du coit.
Maladie de la tsétsé.
Maladie de Soemedang.
Maladie du coit.
Maladie du prurit.
Maladie vénérienne du cheval.
Marri.
Nagana.
Nikalgaya.
N'gana.
Nygana.
Oae.
Pernicious anemia of horses.
Peste de cadeiras.
Pferdestaupe.
Phenta.
Phenta-ka-darad.
Phera.
Pheta.
Phetra.
Phitgaya.
Photra.

Polynevrite infectieuse du cheval.	Tap-dik.
Poona.	Tape-dik.
Purana.	Tarai.
Rat surra.	Tebersa.
Relapsing fever of equines.	Tibarsa.
Sar.	Trypanosomose.
Sara.	Tsétsé fly disease.
Schleichende Fieber.	Tsétsékrankheit.
Sokra.	Tumby-a.
Sukal.	Tumby-baba.
Surra.	Wabai-ki-bokhar.
Surra americain.	Zaharbad.
Surrakrankheit.	Zherbad.
Tap.	Zuchtlähme.

Beri-beri.

Beri-beri at Philadelphia.—The ship *Foohng Suey*, which left Hawaii March 25th, arrived at the port of Philadelphia in the first week of August with thirteen cases of well-developed beri-beri. During the voyage only one seaman developed symptoms of the disease, but by the time the vessel reached Philadelphia thirteen of the crew were attacked. One seaman died from the disease during the voyage. The sick men were removed to the quarantine hospital, and the ship was thoroughly fumigated before proceeding to the city port.

Cholera.

Hong Kong.—May 28th to June 11th, 13 cases, 11 deaths.

Bombay.—June 21st to 28th, 1 case, 1 death.

Plague.

PREVALENCE OF THE DISEASE.

India.—During weeks ending July 23rd and 30th, the deaths numbered 2,608 and 3,258, respectively.

South Africa: Port Elizabeth.—Weeks ending July 23rd and 30th, fresh cases 3 and 2, deaths 2 and 0.

Transvaal.—No cases since July 9th.

Mauritius.—During weeks ending August 11th and 18th, fresh cases 3 and 5, deaths 1 and 3.

Hong Kong.—During weeks ending August 6th and 13th, fresh cases 13 and 5, deaths 12 and 5.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Dysentery.

KAZARINOFF, G. N. Shiga Bacillus in Dysentery, *Rousskii Vratch*, vol. ii., No. 39.—Kazarinoff is of opinion that Shiga's bacillus is the cause of dysentery in temperate climates, and the *Amœba coli* the cause of dysentery in the Tropics.

Dysentery—a New Bacillus.

DUVAL, C. W. Another Member of the Dysentery Group. *Journal American Medical Association*, 1904, August 6.—In a case of dysentery occurring in a boy, aged 17, at the Boston City Hospital, Duval isolated what he believes to be a new bacillus of dysentery. It differs from all other dysenteric bacilli described, by the fact that it splits lactose and produces a marked acid change in neutral litmus milk. The bacillus is agglutinated in high dilution with the blood of typhoid fever patients and with the blood of rabbits immunised to this organism. The organism isolated from this fatal case of dysentery is a fairly short bacillus, with rounded ends, ranging from 1 to 3 microns in length, often coccoid in form, and occurring singly and in pairs. The bacillus stains with the aniline dyes, but all the bacilli in a preparation do not stain with equal intensity. The organism is readily decolourised by Gram's method. It is non-motile under ordinary conditions. Spores have not been noted. Flagella may be demonstrated by the modified Van Ermengen method, as described by Vedder and myself. In general, the morphology and staining reaction of the bacillus is that of *B. dysenteriæ* (Shiga).

Malaria—Anti-Mosquito Crusade.

Dr. DOTZ is using a solution called "Bordeaux," which is mainly composed of sulphate of copper and lime, for destruction of mosquito larvæ in the pools in Slaten Island, New York.

Malarial-Intestinal Hæmorrhage.

CLARK, S. F. On Hæmorrhage from the Bowel in Malarial Disease. *Journ. Roy. Army Med. Corps*, 1904, August.—In Karachi, India, in 1893, Major Clark first met with cases of severe hæmorrhage from the bowel during malarial attacks. In Hong Kong he also saw eight cases of the kind.

A Typical Case.

A man is brought to hospital with a sharp attack of malarial fever, generally tertian, and he states that he has suffered a good deal lately from "fever and ague." The case seems to be similar to dozens of others which are in hospital, and the usual treatment is ordered. Presently he asks for the bed-pan, and on removing it the stool is found to be copious, quite liquid, and of a bright red colour; it is, in fact, almost pure blood. The copious nature of the stool causes alarm, which is not lessened when, after a short interval, another similar motion is passed, followed later on by more. It would appear as if the whole of the blood in the patient's body was being passed *per rectum*. An act of vomiting, so common in the hot stages of malaria, is very liable to be followed by an evacuation of blood from the bowel. The stool comes away quickly and easily, without pain. In some cases the bloody motions are preceded by two or three liquid stools devoid of blood, but in other cases the first motion passed consists of blood. If the hæmorrhage be not checked the patient becomes collapsed and dies, but a fatal termination is rare when treatment is prompt, and cases which seem quite hopeless can be pulled through.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

SOME OBSERVATIONS ON BERI-BERI.

By E. A. O. Travers.
State Surgeon, Selangor.

The absolute control possessed by the Medical Officer in charge of a gaol over the food supply and general hygienic conditions under which the convicts live renders the study of any disease attacking the prisoners a comparatively easy matter. For this reason most of the work done in this State in connection with the investigation of beri-beri has been carried out at the Pudoh Gaol, Kuala Lumpur, Selangor, which institution has, since the year 1895, and until the month of February in the present year, never been entirely free from the disease.

It is hoped that certain observations made in Selangor during the past year may tend to throw some light on some hitherto more or less obscure points in connection with the disease.

A paper recording an experiment made by me in connection with the theory of the causation of beri-beri by rice was referred to by Sir Patrick Manson at the annual meeting of the British Medical Association in 1902. It was there shown that from the year 1892 to 1894 no case of beri-beri had originated in the Kuala Lumpur Gaol. The prisoners were then transferred to a new gaol about two miles away, and in this institution beri-beri broke out in 1895. About 100 prisoners were then sent back to the old gaol, the food with which they were supplied being in every respect similar to that consumed by the prisoners at the new gaol. For the first three months the food was actually cooked in the new gaol and carried to the old gaol twice daily. No cases of beri-beri occurred among the prisoners during the nine months spent by them at the old gaol, whereas no less than 323 cases occurred in the new gaol during the same period. The result of this experiment was taken to prove conclusively that, in at any rate this instance, there was no connection between the rice eaten by the prisoners and the beri-beri from which they suffered.

Some years having elapsed since the date of the above experiment, I thought it advisable to, if possible, confirm the results then arrived at by a somewhat more extensive observation carried out under conditions which would exclude all possibility of error. The institutions selected for observation were the Pudoh Gaol, the Tai Wah Institution and the Leper Asylum.

The Tai Wah Institution is set apart for the care of persons suffering from incurable disease, or who are unable to support themselves. On October 31st, 1902, there were fifty-one patients in the wards, all of Chinese nationality. These Chinamen were, almost without exception, formerly employed as coolies, and were drawn from the same class as the inhabitants of the Pudoh Gaol. Of the fifty-one patients, forty-three, or 84·5 per cent., had been continuously in the hospital for over seven months.

The Leper Asylum is, as its name implies, exclusively set apart for the treatment of lepers. On October 31st, 1902, there were 131 patients in the wards, of which 129 were Chinese and two Tamils. One hundred and eighteen, or 90 per cent., of the inmates had been continuously in the Asylum for more than seven months.

The two hospitals referred to and the Pudoh Gaol are supplied with Rangoon rice by the same Chinese contractor; it is purchased from a merchant in Penang, it is taken delivery of at the Kuala Lumpur Railway Station and is removed to a store in the town. This store is light, clean and well ventilated. The rice is kept on a platform raised from the ground, and is distributed to the various hospitals as required. At no time is more than three weeks' supply kept in the store, and the bags of rice are taken out and sent to the various institutions without selection of any kind.

In the Pudoh Gaol, the Tai Wah Institution and the Leper Asylum we have three institutions, the inhabitants of which are of the same nationality, and the Rangoon rice consumed by them is supplied from the same source, by the same contractor. It would be reasonable to suppose that if the disastrous outbreaks of beri-beri in one of them—the Pudoh Gaol—were caused by a toxin conveyed by Rangoon rice, the patients in the other two—the Tai Wah Institution and the Leper Asylum—should suffer from beri-beri in the same way as the inmates of the prison. This, however, is not the case, and no outbreak of beri-beri has at any time occurred in either the Tai Wah Institution or the Leper Asylum.

From January 1st to October 31st, 1902, 291 fresh cases of beri-beri occurred among the prisoners in the Pudoh Gaol, whereas not a single case of beri-beri occurred among the patients at the Tai Wah Institution or Leper Asylum. This, I think, disposes of the theory of the connection of beri-beri with the consumption of rice.

Beri-beri a Place Disease.

The history of beri-beri at the Pudoh Gaol during the last eight years affords a striking confirmation of the theory of the endemic nature of the disease.

It has been mentioned that beri-beri first broke out in the gaol in 1895. In the month of November, 1897, fifty prisoners were attacked with the disease, of whom sixteen died, the average number of prisoners in the gaol at the time being 349. A Commission consisting of three Government surgeons was then appointed to investigate the cause of the outbreak and to make recommendations for the improvement of the health of the prisoners.

The influence of food supply having been practically eliminated, it was considered that in all probability the cause of the disease was some germ or toxin present in the gaol itself. It was recommended: (*a*) That the gaol buildings and premises be thoroughly treated with a disinfectant fluid; (*b*) that as great a number of the prisoners as possible be sent early each morning to work at the District Hospital, some three miles away, that they should have their meals at the place of work and only return to gaol in time for lock-up in the evening.

The recommendations of the Commission were at once carried out, the gaol was disinfected with a

solution of 1 in 1,000 perchloride of mercury, and all prisoners who were able to work and were not employed as cooks were sent to the District Hospital, to level the grounds and fill up swamps. The work at the District Hospital was continued until January 14th, 1899, the number of convicts employed varying from 200 to 310.

The following table shows the number of cases of beri-beri occurring for six months before and after the extramural work at the District Hospital was started.

Date	Beri-beri at Gaol: Cases	Beri-beri at Gaol: Deaths	Remarks
1897—			
June	17	1	Prisoners working in gaol.
July	12	1	
August	35	2	
September	35	6	
October	35	8	
November	51	16	
December	7	0	Prisoners working at District Hospital.
1898—			
January	4	0	
February	3	0	
March	2	0	
April	17	0	
May	1	0	
June	1	0	

The improvement in the health of the prisoners when working outside the gaol was therefore most remarkable.

In January, 1899, the work at the District Hospital having been completed, the prisoners were employed partly inside the gaol and partly on various public works outside the walls.

The following table shows that after the return of the prisoners to intramural work the cases of beri-beri steadily increased in number.

Year	Cases of Beri-beri	Deaths	Remarks
1898	73	2	Prisoners working outside gaol.
1899	73	7	Prisoners working partly inside and partly outside gaol.[1]
1900	180	7	Prisoners working inside gaol.
1901	205	5	
1902	470	55	

It would appear, therefore, that after the return of the prisoners to work in the gaol the germ, or toxin, which is the probable cause of the disease became gradually more active in its ill-effects on the prisoners. It may be that the amount of poison causing beri-beri in any locality or building may be increased by the residence of cases of beri-beri in it. The experience of prisoners in the Pudoh Gaol convinces me that this is the case, and that a man suffering from beri-beri, if kept in a confined space, is capable of reinfecting himself to a dangerous extent.

In January, 1902, a very serious increase occurred in the number of fresh cases of beri-beri in the goal. The epidemic became a severe one and continued throughout the year, 470 fresh cases being admitted to the infirmary, with 55 deaths.

Having in view the excellent effect of extramural work on the health of the prisoners in the year 1897-8, I urged upon Government the advisability of again keeping the prisoners outside the gaol walls for the greater part of the day. My recommendations were acted upon, and large temporary worksheds were constructed outside the walls on an open space about 100 yards from the gaol. The sheds were ready for occupation on September 26th, 1902, and all prisoners who could walk and were not employed as cooks, sweepers, &c., inside the gaol were sent out to work. On October 20th I noted a very marked improvement in the health of the prisoners.

The following figures show the number of fresh cases of beri-beri occurring in the gaol for six months before and after the prisoners were put to extramural work. In order to show that the marked improvement in the health of the prisoners was not part of a general decrease in the number of beri-beri cases in Kuala Lumpur, I have also shown the number of admissions for and deaths from beri-beri at the District Hospital during the same period.

Date	Pudoh Gaol: Cases Admitted to Infirmary	Pudoh Gaol: Deaths		District Hospital: Cases Admitted	District Hospital: Deaths
1902—					
April	56	4	Prisoners working inside gaol	81	15
May	66	6		84	23
June	54	5		67	18
July	39	7		67	14
August	28	2		56	10
September	37	7		40	5
October	39	1	Prisoners working outside gaol	54	12
November	9	0		55	6
December	16	2		67	14
1903—					
January	8	1		67	16
February	0	0		61	7
March	0	0		61	11

It will be seen from the above figures that, whereas 280 cases of beri-beri, with 31 deaths, occurred among the prisoners during the six months they were working in the gaol, only 72 cases, with four deaths, occurred during the six months after the prisoners were put to extramural work. The figures relating to the cases of beri-beri admitted to the District Hospital during the period under review show practically no variation.

The beneficial results of extramural work in 1902-1903 so closely resemble those experienced in 1897-1898, that I think they may be accepted as very strong evidence of the influence of locality as a cause of beri-beri. From February 1st, 1903, until the time of writing (August 25th) not a single case of beri-beri has occurred in the Pudoh Gaol.[2]

[1] During the year 1899 a large gang of prisoners were employed on road-work outside the gaol.

[2] During the year 1903 only two cases of beri-beri originated in the gaol. During the present year a few cases have been admitted to gaol with the disease, but three only have originated in the gaol.

While ascribing the disappearance of beri-beri from the gaol to the fact that the prisoners now work in the open air outside the gaol, it is necessary to mention certain other measures taken with a view to improving the health of the prisoners.

It having been noticed that prisoners convalescent from beri-beri almost always suffered from a serious and often fatal relapse when sentenced to a diet of bread and water with solitary confinement in cells for offences against prison discipline, I stopped all punishment diet in cells on November 7th, 1902.

Several prisoners having complained that the kanji, or rice gruel, cooked over night and served out to them in the morning gave them indigestion, it was arranged that from October 20th, 1902, the kanji should be made in the morning and given to the prisoners hot at 5 a.m.

The whole of the gaol premises were carefully disinfected with 1 in 1,000 perchloride of mercury between November 30th, 1902, and March 31st, 1903. It is not likely that this could have been the cause of the sudden cessation of the epidemic in November, 1902, more especially as only one block at a time could be disinfected.

The ventilation of all the cells has recently been considerably improved, but as the work has taken some eight months to complete it cannot be said to have had much influence on the disappearance of the beri-beri.

The Ill-Effects of Over-crowding and Bad Ventilation.

Sir Patrick Manson, in his "Tropical Diseases," attributes much importance to the influence of overcrowding on beri-beri, and instances the life in Oriental gaols, armies, ships and asylums. Our experience in Selangor affords very strong confirmation of his views.

By far the greater number of the Chinese admitted to the Selangor hospitals with beri-beri are tin-mining coolies. These men live together in long sheds or kongsis, which are carefully closed in at night and the atmosphere of which is exceedingly close and fœtid. Beri-beri frequently attacks nearly all the coolies living in one of these sheds. The agriculturists, on the other hand, who are mostly independent gardeners living in little huts by themselves, are very rarely attacked by beri-beri.

The prisoners in the Pudoh gaol, who were shut up in the indifferently ventilated cells for two or three days at a time, on punishment diet, were almost invariably very seriously affected, although they were quite alone in the cell. It would seem, therefore, that a person having recently suffered from beri-beri, if confined in an enclosed space, is capable of reproducing in himself a severe attack of the disease.

Influence of Monsoons.

In his remarks on beri-beri at the Pudoh Gaol in Study No. 1, vol. ii., of the Institute of Medical Research, Dr. Hamilton Wright states: "It appears to be true that the great majority of cases of beri-beri occur in the Malay Peninsula during the north-east monsoon. It is certainly true of beri-beri in the Kuala Lumpur Gaol."

Our experience during the year 1902 is entirely opposed to the above view, for, whereas 157 fresh cases of beri-beri occurred during the north-east monsoon, no less than 282 prisoners were attacked for the first time during the south-west monsoon. I am of opinion that neither monsoons nor rainfall have anything to do with the prevalence of beri-beri.

The Incubation Period of Beri-beri.

There is some divergence of opinion as to the length of exposure to the influences causing beri-beri which is necessary for the production of the disease. In order to arrive at the approximate period between the date of sentence and appearance of symptoms of beri-beri in prisoners at the Pudoh Gaol, the following observation was carried out.

On admission to the gaol each prisoner was carefully examined as to any previous history of the disease, he was questioned through an interpreter as to any previous lameness, swelling or numbness of his legs, and his knee reflexes were tested; should he have any history of either symptom, or show abnormality of reflex or any other sign of beri-beri, he was put down as having previously suffered from the disease, and was not included among the cases of beri-beri originating in the gaol. Two hundred and fifty-six cases of beri-beri originating in the gaol were thus noted, and the period of time between the date or admission to gaol and the first appearance of symptoms of the disease is given in the following table.

Period of time between date of sentence and date of appearance of symptoms of beri-beri.	Number of prisoners contracting beri-beri.
Under one month	11
Between one and two months	45
,, two ,, three ,,	67
,, three ,, four ,,	40
,, four ,, five ,,	27
,, five ,, six ,,	25
,, six ,, seven ,,	8
,, seven months and one year	13
Over one year	20
Total number of cases	256

It will be seen that 59·3 per cent. of the cases occurred in prisoners who had been in gaol for a period of between one and four months, and 79·6 per cent. between one and six months. The usual period of incubation in the Pudoh gaol may therefore be taken at from one to six months, most frequently between one and four months.

The Sequelæ of the Disease.

Few of the writers on beri-beri mention anything about the after-effects of an attack of the disease. Scheube says: "Recovery is the most frequent termination to beri-beri. In many cases, however, the cure is not a complete one, disorders remain for a long time, some of them for the entire period of life, occasionally debarring the patient from being considered able-bodied again." The same observer states: "Miura entirely eschews the occurrence of sequelæ. He says when kakke terminates in recovery it is always a complete one." No mention of sequelæ is made by Sir Patrick Manson in his work on tropical diseases.

The question as to whether any permanent injury

to health is likely to be caused by an attack of beri-beri seems to me to be a most important one, more especially with regard to the future fitness for manual labour of large gangs of coolies.

In hospitals, where the patients are discharged as soon as they are able to walk about, no knowledge of the subsequent history of beri-beri cases is obtainable. In gaols, however, where long-sentenced prisoners may remain for years after recovery from the disease, an excellent opportunity for observation presents itself.

With a view to ascertaining the presence or absence of sequelæ of the disease among the prisoners in the Pudoh Gaol, all the convicts who had suffered from beri-beri during the previous year and were still in the gaol were examined by me on August 20th, 1903. The heart was examined, knee reflexes tested, and power of locomotion noted in each case, and the prisoners were interrogated as to condition of appetite, presence or absence of numbness or pain in the limbs, and general health. All the prisoners looked well and were employed at ordinary hard labour; they all walked strongly, and none of them had any sign of œdema. With one exception there were no signs of heart affection of any kind. The condition of the knee reflexes and the presence or absence of any sequelæ of the disease is shown in the following table, which also gives the month in which the patients were discharged from hospital:—

Date of discharge from Infirmary	Number of cases	Normal in every way	Condition of reflexes			Other symptoms
			Absent	Weak	Exaggerated	
1902—						
July ..	1	—	1	—	—	—
August ..	1	1	—	—	—	—
September	6	5	1	—	—	—
October ..	17	13	1*	2†	1	*Also had mitral regurgitation. †Also had numbness of legs.
November	4	3	—	1	—	—
December	17	9	5	3	—	—
1903—						
January ..	1	1	—	—	—	—
Total ..	47	32	8	6	1	

It will be seen that of forty-seven prisoners examined, thirty-two were in perfect health. The knee reflex was absent in eight, weak in six, and exaggerated in one. Two prisoners complained of slight numbness of the legs, and one in addition to absence of knee reflex had well-marked mitral regurgitation. All the prisoners examined were fit for hard labour, except, perhaps, the one with mitral disease, who made no complaint of weakness and who was working with the others. The conclusion arrived at is therefore that absolute recovery is the rule.

Mortality.—The mortality from beri-beri in Selangor varies to a remarkable extent, as may be seen by the following figures taken from the Annual Medical Report for 1902:—

Hospital	Number of beri-beri cases treated	Deaths from beri-beri	Death-rate from beri-beri	Remarks
Gaol Infirmary ..	470	55	11·7 %	This includes fresh cases of beri-beri only.
District Hospital, Ulu Langat	145	4	2·75 %	A mixed mining and agricultural district.
District Hospital, Kuala Kubu	135	51	37·7 %	A mining district.
Lunatic Asylum..	21	9	42·85 %	—
Total number in all hospitals and infirmaries	2,673	325	12·15 %	—

The Pudoh Gaol has now, after having been scourged by beri-beri for nearly seven years, been free from the disease for seven months. Although there is still some doubt as to the actual cause of the outbreak, it is hoped that our experience of the disease among the prisoners may not have been entirely valueless, and that some hitherto obscure points may have been elucidated by the various observations carried out.

ON THE OCCURRENCE AND PROBABLE ORIGIN OF YAWS IN SOUTH CHINA.

By John M. Dalziel, M.D., B.Sc.(Public Health)Edin.

[Only one of the photographs forwarded by Dr. Dalziel could be inserted with this article.—Ed., *J. T. M.*]

Four years ago the present writer described a case of yaws which had been observed in the hospital of the English Presbyterian Mission at Swatow, in the south-east corner of the Canton province. During the two following years other cases of the same condition presented themselves from time to time in that institution, and as the existence of this disease in China would appear to have escaped due recognition, I hope a record of some of these cases may be of interest. So far as I am aware, no text-book with which I am acquainted, except that of Scheube,[1] includes China in the geographical distribution of yaws.

The only presumable cases which have been brought to my notice in China, apart from those which have come under my own observation, are as follows: (1) A woman, aged 40, in Soochow, recorded by Dr. Margaret Polk (in the *China Med. Miss. Journ.*, April, 1900) as a possible case. (2) A woman, whose photo is shown in the Journal of Tropical Medicine, April 15th, 1901, from Dr. Cousland, Chao-chow-fu, near Swatow. (3) A man, aged 32, seen by Dr. Arthur Samson, C.M.S. Hospital, Hinghwa, near Foochow. The notes and a photo of this patient, taken on arrival in hospital, were sent to me by Dr. Samson, and they appear to be those of a case of yaws.[2]

[1] "The Diseases of Warm Climates," second revised edition, 1902, p. 290.

[2] In view of the disputed identity of yaws and syphilis, it may be noted that six days after arrival this patient developed a typical primary chancre, with enlarged inguinal glands.

The introduction of a new disease into a hitherto virgin community is more than a matter of interest to the compiler of medical knowledge, but has an epidemiological importance, and one may be justified in bringing to notice the occurrence of frambœsia in one portion at least of the Chinese mainland, to which the disease has probably been imported within quite recent years. The general features of the eruption in all the following cases were the same, and a brief description is given here.

General Signs and Symptoms.

Crops of papules on body, scalp, or limbs, appear, enlarging into dome-shaped tubercles, each covered by a dirty yellow crust, constituting in well-marked cases a symmetrical and widespread eruption. In outline these are round or oval, attaining a hemispherical shape, and at maturity varying in size from three-quarters to one-quarter of an inch or less in diameter. They invariably rise abruptly from a perfectly healthy base, absolutely free from all trace of induration or discolouration, and with the crusts removed have simply the appearance of rounded pieces of firm granulation tissue adventitiously fixed to the healthy skin. From the more mature tubercles the crust can be easily detached, exposing a soft but compact growth of granulation tissue, somewhat obscured by a thin creamy deposit on its surface. On those tubercles which have not yet attained maturity the crust adheres more closely, and the effort required to detach it is sufficient to cause bleeding from the highly vascular excrescence. On removal of the crust from an immature tubercle a thin serous fluid exudes, and on gently wiping the surface the compact head of pale papillary granulations resembling pieces of cauliflower in proportions, but not in colour, can be directly inspected. The application of dilute hydrochloric acid to the moist, exuding surface elicits very little smarting, and although the tumour is not insensitive, a little free handling causes comparatively little pain.

This is the typical "yaw," the raspberry (*Framboise*) lesion described with great uniformity in most descriptions of the disease, but to the native mind, as also to the foreigner acquainted with local fruits, a comparison to the Chinese arbutus (*Myrica sapida*) commends itself as even more apt in describing at once its consistence, the relative proportions of the papillary elevations composing the growth, and even its colour, if an under-ripe fruit be selected as the standard. Scheube states *yang mey tcheang* (*i.e.*, arbutus sore, or ulcer) as the name for yaws in China; but it must be said that the term "*arbutus sore*" appears to be already in use in the Swatow or Teochew district, as the name of an altogether different condition, which is probably a true syphilide, and the eruption, in the cases which form this paper, certainly appeared to trained native assistants of many years' experience in the Swatow Hospital as an unfamiliar condition different from that already known to them as "arbutus sore."

The following is a description of a representative case:—

Case 1.—Ah Kim, aged 43, a native of a village some forty miles from Swatow, came to hospital on October 4th, 1901, with face and body covered with prominent yaw tubercles. The history he gave was that about two years previously a neighbour had returned from Siam to his village, bringing with him a child whose body was covered with the same type of eruption. Patient's child, a girl, was infected from the latter, presumably in playing together, and Ah Kim himself probably acquired the disease from his daughter, according to his own belief, either from sleeping with her, or from bathing along with her.

The first appearance in his case had been a large scabbed sore on the left forefinger, which had developed three months before admission to hospital (*i.e.*, in July, 1901), and which was followed, after the interval of a month, by a general eruption all over the body. The appearance of the latter had been accompanied by some fever and shivering, such as any Chinese might be subject to at the onset of any illness: there had been no pain in the joints and no other constitutional symptoms.

On admission he presented[1] a most striking eruption of yellow-crusted yaws on face and head, and all over the body front and back, with the exception of the parts covered by the short trousers, there being a few above the knees but none on the upper thighs and buttocks. They were particularly numerous on the back, where they appeared large and flat-topped, some of them being the size of a half-crown piece. On the face these excrescences were very numerous, and were confluent on the chin, where they formed a large, prominent, fungating mass covered by the usual dirty yellow crusts, while on the shaven scalp the bristly tufts of hair occupying the fungoid tubercles indicated no deterioration in the hair follicles. The original lesion presented at this

[1] For the block accompanying this paper I am indebted to the Rev. J. Steele, Swatow.

date all the characters of a large crusted fungoid excrescence of irregular shape, occupying the second phalanx with its proximal joint of the left forefinger, extending around about two-thirds of the circumference of the finger, and differing in no essential particular from the typical forms of the general eruption, which had developed a month later and which was now mature. There was no disturbance of the general health, except such as might be accounted for by loss of sleep from the discomfort caused by lying down. Itching had not been a pronounced feature in the development of the eruption, nor had it been attended by pain in the joints. In spite of the widespread and exuberant eruption no glandular enlargement could be detected. In this case the tubercles were all at one stage, differing only in size, no specimens of early papular forms, or of the later resolving patches, or of pigmented spots, being visible.

Treatment.

The treatment consisted of potassium iodide, gr. 24, daily, and perchloride of mercury, gr. $\frac{3}{16}$, daily, while ointment of the yellow oxide of mercury was applied locally after removing the crusts, where these were not adherent.

The patient remained in hospital for six days, during which time no new tubercles appeared, and the existing ones showed an unmistakable improvement, the crusts becoming looser and the moist excrescences tending already to shrink and become dry on the surface, thus indicating even at this early stage of the treatment the commencement of decline in the eruption. On his return from his village, where treatment had been suspended latterly, he was seen again on October 31st, at which date the eruption was in process of drying up all over the body and face, the large growth on the finger and the confluent mass on the chin having diminished to about half their former prominence.

After returning again to his home patient was seen once more on November 15th, and the improvement was most pronounced. The face was entirely free, short of its natural smoothness, even the large fungating mass on the chin having almost completely resolved, leaving only some irregularity of surface, the rest of the face, forehead and scalp, showing in the sites of the tubercles pale blotches of smooth skin with darker centres. On both surfaces of the trunk all the yaws had resolved in greater or less degree, even those which were most tardy in decline showing now rough reddish-brown patches, with a slightly elevated surface from which cheesy particles of epidermis and scab could be picked off, leaving a roughened, dry, warty-looking plaque surrounded by a smooth pale areola. Others in a further stage of resolution showed only small areas of reddish-brown skin papillæ, from which the red colour disappeared on pressure, leaving spots of brown pigmentation surrounded by a white halo rather sharply defined from the naturally bronzed skin.

The mercurial ointment was stopped but the iodide was continued, and a few weeks later the eruption on the body was represented in places by pale maculæ, bearing a superficial resemblance to old vaccination scars; in other places, these in a further stage were losing definition of outline and were scarcely distinguishable from the normal skin, a fact which proved the absence of true scarring, as was confirmed by subsequent observation a few weeks later.

Recovery was uninterrupted, and in the period during which he was under observation no fresh crops of yaws developed. The appearances and course in this case appear to me to be quite characteristic of a benign "papillo-fungous" type of yaws, absolutely free from ulceration and scarring, each tubercle disappearing by one process only, viz., drying up by interstitial absorption, with a return to perfectly normal skin.

The exceedingly rapid effect of iodides along with mercury is a feature in common with all my cases, and is quite in accordance with the experience of many (though not of all) who have treated yaws both in the West Indies and Fiji.

The initial lesion in this case preceded the general, or so-called "secondary," eruption by a month. It disappeared *pari passu* with the others, was larger and more irregular in size, but otherwise similar to the later tubercles, and was thus in agreement with all my other cases in which a primary lesion was discernible—merely an early or primary *yaw* and not a sore or ulcer of special characters.

The pigmentation of spots marking the sites of former lesions was slight in degree and of short duration, differing from some of the other cases in which clustered dots of dark pigment persisted for months.

The following case presents points of interest in the circumstances of origin, and in some of the clinical features.

Case 2.—Chim-nay, aged 36, returned to China from Annam in May, 1901. When in Cholen, near Saigon, in the end of April, he was bitten by a dog on the calf of the leg. The wound healed, but in July the scar broke out again in the form of what the patient described as a "numb ulcer." To this a native poultice of cowdung was applied, with the result that a ring of ulceration formed around the first sore, and on these there developed tubercles of granulation tissue which were treated by the application of native bluestone. Four or five weeks later similar excrescences appeared on the body, the development of which had been attended by itching, and had been preceded by aching of the legs and shivering.

When first seen on October 10th, 1901, a sparse but widely distributed eruption of crusted tubercles on a healthy base was present over the trunk, front and back, and arms, and a fairly plentiful distribution of large tubercles on the buttocks, lumbar regions, and upper parts of the thighs. All these were covered by dirty crusts discoloured by copper sulphate. On the shaven scalp and at the margin of the hair were several coarse, warty excrescences devoid of crusts, in the drying stage, and bristly with the strongly growing hair. Smaller crusted yaws were also to be seen on the front of the neck, on the face, eyelids, around the nose and occupying each nostril, on the upper lip but not at the buccal margin, on the ear lobes and symmetrically placed in either auricle. The anus and perineal region were free, but there was one soft and uncrusted yaw on the corona

glandis. (The only other case showing this exceptional site was that of a child, aged 5, in whom a similar soft, raspberry-like tubercle formed on the raphe of the prepuce, in the course of a general eruption elsewhere.)

The site of the original infection on the calf was occupied by a central scab surrounded by an irregular circle of raised scabs, which when removed revealed the usual rounded lumps of firm granulations, passing now into the dry stage. There was no local induration, but both inguinal and saphenous glands on both sides were enlarged. On the sole of the right foot there was a dry tubercle to which bluestone had been applied, and which was nearly healed, while the whole surface of the sole was mottled with scaly patches, suggestive of abortive papules which had been absorbed before they reached the surface. In this case, besides the peculiar site of inoculation, the enlarged glands were a feature hardly observed in any of the others, most of whom with widespread and exuberant eruptions had no glandular enlargement whatever. In two or three cases, however, the femoral or supratrochlear glands were enlarged, always in association with some irritated or unscabbed yaws on the corresponding side. It will be seen that this represents something entirely different from the general polyadenitis of syphilis, a distinction emphasised by Numa Rat and others, who refer to the absence of adenopathies as characteristic of yaws. On the other hand, buboes, most frequently of the femoral glands, or general adenitis, are stated by others, with different degrees of insistence, to belong to the essential nature of yaws; Charlouis[1] and Firth[2], describing what would appear to be specific glandular enlargements, while Kynsey admits a specific polyadenitis in yaws as in syphilis. But careful enquiry into cases reported from various sources serves to suggest that the enlargement of the glands might be due not to the action of the specific poison of yaws, but to the absorption of septic matter, so frequent is the association of the adenitis described with the occurrence of irritation and ulceration of the yaws situated on the area drained by the glands involved. Thus in the West Indies the condition known as "tubboes" on the feet, onychial and other forms of ulceration, non-crusted tubercles, &c., are generally to be found in sympathetic association with femoral, inguinal, or cervical gland enlargement. In Java and Sumatra analogous conditions known as "bubul" on the soles, and "patch" on the hands, have been found to be associated with enlargement of the inguinal, crural, and elbow glands. In the Chinese cases adenitis in any situation was a quite unusual feature, and is, I believe, sympathetic rather than specific, and usually attributable to an accompanying infection of the lesions with pyogenic organisms, an event which may readily occur, especially where the crust is accidentally removed.

The circumstances of inception in the case of Chimnay leave some doubt as to the origin of infection, whether this was acquired in Cochin China or at home. If the former, the period of incubation must have been about three months, so that the latter must be held to be the more probable. The usual incubation period of the initial lesion is now believed to vary between ten days and about six weeks, periods of months sometimes quoted being rightly held to be open to doubt. On the other hand, he came from a village from which many patients came from time to time to the Swatow hospital, but from which no other similar case has been observed, and it may be added that that village was in a district remote from any which supplied the other cases.

The following case formed one of a connected group of nine persons in whom direct contagion could be fairly definitely traced.

Case 3.—Ah Yu, aged 38. In July, 1900, a crusted tubercle developed on the scalp, followed after an interval of about a fortnight by another on the sole, and numerous others on the back. When seen for the first time on August 23rd, there was found on the middle of the scalp, at the margin of the unshaven part, a large yaw about three-quarters of an inch in diameter, from which the crust was easily removed, displaying the characteristic raspberry-like excrescence just leaving the moist stage. The back was thickly studded with large hemispherical or flat-topped, crusted yaws, some of them an inch or more in diameter. On the right sole, opposite the fourth and fifth toes, there was a similar fungoid tubercle just bursting through the thick skin. The only others were a few of average size on the back of the neck and on the auricle of either ear, the front of the body and the limbs being at this date free. The yaw on the sole was very painful, and elsewhere the commencement of the eruption had been attended with itching, which in this case was not severe and diminished with the full development of the lesions. The patient's health was unimpaired and no enlarged glands could be detected. He received potassium iodide, gr. 15, with perchloride of mercury gr. $\frac{1}{4}$, daily, and yellow oxide ointment locally, but only remained in hospital for two or three days, after which he went home, taking a supply of these remedies for continuance of the treatment.

This first crop almost disappeared during the next few weeks and the remedies were suspended, after which another crop of yaws developed on the buttocks and thighs, along with one large one on the front of the abdomen. On October 20th, when he next reported himself in person, this latter was seen as a prominent excrescence about the size of a walnut, below and to the left of the umbilicus, covered by a crust which was easily removed, revealing the soft raspberry tumour with a whitish secretion, which for the most part adhered to the under-surface of the scab. The former crop on the back had for the most part cleared up, leaving only pigmented stains surrounded by a pale halo, and in a few less advanced spots, patches of a rough, almost warty surface corresponding in size and position with the lesions of the first eruption. The recently formed set on the thighs and buttocks showed resolving rough patches which from their size indicated a large and vigorous crop. The situation of the first noticed yaw on the scalp was not marked by any scar, and another small

[1] "On Polypapilloma Tropicum (Frambœsia)." New Syd. Soc. Selected Essays, vol. cxli., pp. 293, 313.

[2] "Allbutt's System of Medicine," 1897, vol. ii., p. 504.

tubercle was found amongst the hair on the parietal region, while the painful yaw on the sole had from its situation been retarded in development, and now appeared as an irritable fungous tubercle exuding a foul serous fluid, around and over which the thickened epidermis was breaking away and in process of removal.

The same treatment was renewed, and by November 20th all existing yaws had disappeared, except the one on the sole, which was beginning to dry up. He soon ceased taking the medicine, and on December 29th, when he again came to hospital, a new but scanty crop had appeared, scattered on front and back of the body, and two or three small crusted yaws were found on the hairy scalp. The sole was well, the thickened broken skin returning to its natural condition.

The patient was seen again on February 4th, 1901, at which date all previously existing lesions had disappeared, but one fresh yaw was found on the knee, one on the arm and one on the abdomen.

This case illustrates, again, the very favourable influence of small doses of iodide and mercury, but also the futility of expecting a cure unless these remedies be continued long after the eruption has disappeared. In untreated cases, or in those which receive interrupted treatment, the duration varies from weeks to many months, fresh crops or isolated yaws appearing at intervals, in new situations, for a year or two at least. For example, the first case which was diagnosed as yaws in the Swatow Hospital, although treatment had a marked effect so long as the system was under the influence of the drugs, continued to have a recrudescence of yaws in the soles twenty-five months after commencement of his symptoms, a condition perhaps comparable to the "Memba yaws" of the Negro. Itching was not severe in the case of Ah Yu, and subsided when the granulomata was fully formed. In the West Indies this symptom appears to be so frequent that it is even relied on as a diagnostic point between yaws and syphilis, whereas other descriptions either make no mention of it, or refer to it as an occasional feature. It is a variable feature in the Chinese cases, being altogether absent in some, and persistent even in the spots left after resolution of the eruption in others. When present it is certainly not of necessity dependent on scabies.

In this case also the initial yaw on the scalp was simply an encrusted tubercle, quite the same as those of the general crop which followed after the interval of a fortnight.

Ah Yu's wife and four children all suffered from yaws, and the course of infection of this family and through its members presents some features of interest. In the first place, the earliest in the series, and indeed the earliest case of which I have any knowledge, was a girl, Ah Ming, aged 3, who contracted the disease in March, 1899, but from what source she was infected could not be ascertained. Her father had been in Singapore, but had been home for three years, and neither he nor any one else in the neighbourhood of his village could be proved to have been affected. She was brought to hospital on August 23rd, 1900, seventeen months after the first eruption appeared, and showed a copious crop of typical crusted yaws all over the body, face, scalp and buttocks.

From her, a man named Keng-lim, a servant of her father, was infected, the initial lesion developing in the form of two tubercles on his wrist, and the general eruption appearing some three or four weeks later. The native surmise that this was due to direct contagion from the buttocks of the child whom he carried in his arms is probably correct.[1] Keng-lim's wife subsequently became affected, a point of interest not observed in any of my other cases being the occurrence of a few tubercles on the palms of the hands.

About the same time (August, 1899), Ji-mue, aged 9, a daughter of Ah Qu, acquired the disease in carrying Ah Ming, the first appearance being in the form of two tubercles on the left hand, suggestive of direct contagion in the same manner as Keng-lim. Next, Soi-mue, aged 4, third daughter of Ah Yu, was affected in November, 1899. Two tubercles appeared first on the buttocks, apparently from the hand of Ji-mue, by whom she was carried.

Toa-mue, aged 14, eldest daughter of Ah Yu, became affected in June, 1900, and by a curious coincidence the initial yaw developed on the centre of the scalp, exactly as in the case of her father, who showed the same site of commencement a month later. This girl showed a more copious eruption, commencing ten days after the primary yaw, with excrescences of larger size than any of the other cases, and it is interesting to note that while the eruption progressed with a particularly rapid development, treatment was followed by a most rapid and complete recovery, which was maintained during several months of occasional observation.

Ah Yu's wife, aged 37, acquired the disease early in June, 1900, when a large yaw developed on the epigastrium, followed in four weeks' time by a general eruption on back and arms, the legs and face being free. In this case there were initial symptoms in the form of sensations of shivering, and aching in the back and limbs, particularly in the hands and arms, while the development of the eruption was attended by pronounced itching, a symptom which continued even in the dry plaques and maculæ left after subsidence of the yaws. After a few days' treatment she went home and there a yaw developed on the left nipple, on a sore caused by the bite of her baby, then 14 months old, who at that date showed no appearance of yaws. When next seen in hospital (on October 20th), in addition to the yaw on the breast and a few small ones on the back, she had one on each sole, where the growths were, as was to be expected, modified by the local conditions. A month later no new yaws had appeared and the existing ones were disappearing. When last seen in the end of December, 1900, one small tubercle remained on the hand, the only other traces of the disease being the fading stains left by the past lesions.

Mrs. Yu's infant was seen on October 20th, 1900, then aged 15 months. On Mrs. Yu's first visit to the hospital in August the child was not affected, but after her return the baby developed yaws around the

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[1] The case of Keng-lim, the first in which the diagnosis of yaws was assured, was described in the *China Med. Miss. Journ.*, October, 1900.

mouth, inoculated doubtless from the affected nipple, and three or four weeks later a copious crop appeared on the buttocks and all over the body, as seen on admission.

Cases similarly illustrative of direct contagion are not difficult to find amongst published clinical reports, *e.g.*, in Kynsey's Report on Parangi in Ceylon (a disease which is held to be identical with yaws), a case illustrating a converse inoculation from infant to mother is described, a child with parangi around the mouth infecting the mother's nipple. In the same report the case is mentioned of a father with parangi carrying a child who was thus inoculated on a sore on the outside of the leg, an instance which is almost parallel to those of Ah Ming and others described in the above series. On the whole, the Chinese cases illustrate rather strikingly the mode of communication by direct contact, and so far as they are concerned this would seem to be the usual mode of propagation, though no doubt infected soil, air, water, flies, &c., are capable of conveying the virus without personal contact. It will be recalled that the practice which prevailed among native races, both Negro and Polynesian, of inoculating children must have been suggested by the common occurrence of transmission through contact between the infected and the healthy, an event which has every encouragement to occur sufficiently often in the circumstances of every-day life — children playing, carrying, fondling, &c. — to ensure the disease being frequently contracted in this way.

Varieties in Type.

In comparing the type of disease illustrated by these cases with the chief features of yaws as described by various authorities (in the West Indies, West Africa, Ceylon, Fiji, Assam, and the East Indian Archipelago), it may be fairly claimed that the condition from which they suffered differs from those descriptions as much as and no more than they differ from each other, a consideration which corresponds accurately with the present unsettled state of opinion as to the absolute identity or mere analogy of the diseases observed in different countries, described under different names, and usually grouped under the generic title of yaws or frambœsia. Probably in regard to no single detail is there complete unanimity of opinion. One distinguishes yaws from syphilis by the absence of glandular enlargement, while another adduces polyadenitis as common to both diseases. One describes the eruption as usually symmetrical, a distribution which another denies. Some protest against the use of mercury, while others employ it as the real curative agent. Painlessness, itching, and the absence of constitutional disturbance are referred to in different terms by different observers, mentioned as characteristic features by some, or passed without reference by others.

In China it would appear that the disease, though showing no excessive virulence as sometimes occurs when a contagious disease attacks an unprotected community, shows in the Chinese to whom it has apparently been introduced (in that corner of the Empire at least with which I am acquainted) within the last few years, a perfectly pure type, running a typical and unexceptional course, uncomplicated by any of the anomalies, mixed infections, and so-called tertiary symptoms or sequelæ, which appear to be a feature in at least a proportion of the cases met with in the West Indies and elsewhere, where the disease has been endemic for generations.

Geographical Distribution.

Of some interest for the purpose of this paper is a consideration of the occurrence of yaws in the Orient, a distribution which is doubted or held as not proven by one at least of the best authorities on this disease.[1] It appears to be more frequent than was formerly supposed, or to have recently extended its area in British India, being known to occur on the Malabar and Coromandal coasts, while several observers have from time to time reported cases from other parts of India, and the identity of the paranghi of Ceylon with yaws is definitely admitted by Sir Wm. Kynsey. We find it recorded from Assam, Upper Burmah and Siam, and in the farther East it is probably common in the Malay Peninsula, and certainly in the East Indian Archipelago. With some of these countries Southern China is in constant communication. The Malayan "purru" is probably of the nature of "Oriental sore," an ulcerative condition quite different from yaws, but the "bouton d'Amboine," or "patch," of the Malay, is accepted by almost all present authorities (except Nicholls) as synonymous with yaws, and if so it is interesting to note that the medical account from this part of the world by Bontius (1718), is amongst the earliest authentic descriptions of the disease, and at the same time that this area of distribution must rank in point of extent next to that of the African Continent. The most complete description of this condition from Malaya is that of Charlouis.[2] The points in which the symptoms in his cases differ from those in Swatow are mainly these: prodromal symptoms, fever and pain in the joints appear to be more usual and certainly more severe; the fresh tubercles are described as very painful and surrounded by dark areolæ; and the lymphatic glands are swollen and painful. Now all these symptoms are variously mentioned by one or other writer as only sometimes present in their cases, or on the other hand as characteristic of the disease. The preliminary constitutional symptoms are a notoriously uncertain feature, and in the Chinese, who constantly suffer from brief attacks of ague, a preliminary fever with aching limbs would be totally disregarded, and even if severe would not necessarily be supposed to have any connection with a succeeding eruption. The dependence of glandular enlargement on the yaws poison is by some denied, and its significance is variously interpreted; if it is a constant feature in the Malay it would seem to be more often absent in the Chinese. The painfulness of the growing excrescence is probably of little importance, and the majority of authors are agreed that the yaw is a painless growth. Races, like individuals, vary in their susceptibility to pain, and the Teo-chew Chinese are remarkably callous in this

[1] Nicholls, in "Twentieth Century Practice of Medicine," vol. xvi., p. 311.

[2] "On Polypapilloma Tropicum (Frambœsia)." New Syd. Soc. Selected Essays, 1897, vol. clxi.

respect. The existence of an areola around the base of the granuloma is not mentioned or is expressly denied by almost all authorities, the majority describing the yaw as having the appearance of being planted casually on the healthy skin, an appearance with which the plates appended to written descriptions are in agreement.

On the other hand, the majority of the characteristic symptoms in the Javan patients are just those which were equally noticeable in the Chinese. Added to the unmistakable papillo-fungous character which is a constant feature of the crusted tubercle, the parts affected (including the hairy scalp), the absence of ulceration under natural conditions, the unimpaired health of the patients, the duration, and tendency to spontaneous involution with an absolute return to normal skin, the favourable prognosis both as to the local lesions and as to the constitution, the curtailment of the course of the disease by appropriate treatment, all present altogether a sufficient parallel to the condition which pertains in the cases recorded in this paper. The results of treatment by the same remedies (mercurial ointment locally and potassium iodide internally) are similar, and had the Chinese cases been under observation for a month or two of continuous treatment it is possible that they might have recovered in that time without relapse, the occurrence of which is not mentioned by Charlouis.

Admitting, then, the identity in general type, with only such variations as are more or less to be expected when a disease affects a new race in a new country, let us trace the incidence of yaws in the Malay Archipelago.

It is endemic in Java both amongst natives and Chinese, widely endemic in the Molucca group, the Celebes, and many of the smaller islands between Sumatra and the mainland. Hirsch[1] mentions that its colloquial name in Timor is *Buba* or *Boba*, and that it is called *Bobento* in Ternate in the Mollucas, where also the island of Amboyna has given it a name which has ceased to be local. Cases are described from Deli in Sumatra by Dr. L. Martin,[2] and from Borneo by Captain F. Smith, A.M.S.[3] Sir William Macgregor mentions yaws as endemic in New Guinea, and Professor R. Koch, in the course of the German Malaria Expedition, found it to be very common indeed in the German colonies, German New Guinea and the neighbouring Bismarck Archipelago, the Carolines and Ladrones, and widely spread throughout the South Sea. There is thus very little doubt that the disease exists extensively in parts, less frequently in other places throughout the whole East Indian Archipelago from Sumatra to New Guinea. Whether as part of an endemic focus or as a possible result of the importation of African slaves to a Spanish colony prior to the emancipation, the disease might be expected to occur in the Philippines, but I can find no reference to its existence in these islands at any time.

[1] "Geographical and Historical Pathology," 1885, New Syd. Soc.

[2] Journal of Tropical Medicine, June 15th, 1901, p. 202.

[3] *Lancet*, October, 1894, p. 910.

Possible Source of Infection.

So extensive a diffusion of a contagious malady like yaws over this region derives interest from the fact that the bulk of the Chinese in Malaya belong to the provinces of Canton and Fokien. Indeed, a very large proportion of them come from those districts in China which find their points of departure in the treaty ports of Swatow and Amoy. From the port of Swatow some 50,000 to 70,000 coolies are exported annually to supply the labour market in different parts of the Malay Peninsula, Siam, French Cochin China, the Dutch Indies, and latterly New Guinea, and of these it is estimated that about 25 or 30 per cent. return after some years. Besides these, numbers of families and individuals emigrate as a private enterprise, and many Chinese find their way to the various islands of the Archipelago.

Now to return to our cases—in some of them the origin of infection by a returned emigrant from the Straits or elsewhere could be proved, but in others evidence as to the presence of such individuals bearing the disease was not complete. Ah Ming would appear to have been the source of contagion, directly or indirectly, to the group of eight persons already referred to. It was known that this child's father had been in Singapore three years previously, but the child was born after his return, and there is no evidence that he had the disease at that time. The source of infection in Ah Ming, therefore, cannot be ascertained.

In the case of Ah Kim there is a definite statement that his daughter, and indirectly Ah Kim himself, had been infected from a child who arrived from Bangkok suffering from yaws. The source of the disease, then, in this case was no doubt in Siam, contagion on board ship being more than doubtful, since the incubation period of the disease is always longer than the time required for the voyage (about eight days—steamers carrying native passengers from Bangkok to Swatow almost invariably go direct, without touching at any other port *en route*).

Chim-nay received a dog-bite on the leg shortly before embarking at Saigon. What happened in his case was probably that the scar broke down (an exceedingly common occurrence in the leg ulcers of Chinese coolies) and the poison of yaws was inoculated on the sore from some case in his village. The period which had elapsed, however, does not quite exclude infection in Annam or on the voyage to China, but if otherwise the history is suggestive of the existence of yaws in Chinese villages to a greater extent than we have as yet been able to trace.

In the case of a girl, aged 9, who was seen in August, 1900, with a scattered eruption of crusted yaws all over the body and limbs, and whose home was in a village within four miles of the port of Swatow, it was ascertained that a neighbour had the disease at the same time, and that the husband of the latter had recently arrived from the Straits in the same condition. This is closely parallel to Dr. Cousland's case[1] already referred to from Chao-Chow-fu, in which instance the patient and her son acquired

[1] It should be mentioned that Dr. Cousland found anti-syphilitic remedies inefficacious.

the disease from her husband, who was suffering from yaws when he returned from Singapore.

It is unlikely that a direct communication with the Straits or elsewhere abroad would be ascertained in every case, even if we had the complete history, and the evidence of direct transmission from one to another, beginning with the case of Ah Ming, is suggestive enough of how the disease, once introduced, is likely to spread amongst a community possessed of such personal and social habits as the Chinese. That fresh cases are being landed in the persons of returned emigrants from Malaya, and perhaps from Siam, there can be little doubt, and given some time for the contagious affection to work its will, it will not be surprising if some day one may find almost all the children in a Chinese village affected with yaws, as Professor Koch did in the South Seas. Nor is yaws the first communicable disease which has been imported into China in this manner, since we have the precedent of tinea imbricata, which Manson says has spread from its original home in the Eastern Archipelago to the islands of the Pacific and to the China coast. The time has long past when we found it of interest in Swatow to ask the patient, who presented himself covered with tinea imbricata, whether he had been abroad or not, and, like this tinea, yaws has probably come to stay. In a Chinese village population there are all the elements suited for a vigorous propagation of any newly introduced contagious disorder—a virgin soil, filthy habits, crowded and ill-ventilated houses, free social intercourse, scanty clothing, or in summer partial nudity and a plentiful crop of wounds and cutaneous abrasions, ulcers, eczema, ringworm and scabies, affording every facility for the reception of the virus.

From the above experience it would appear that yaws, until recently a rare disease and not indigenous, is now not uncommon in the Teo-chew district, and is probably on the increase. In these days when large numbers of Chinese leave the port of Swatow for the Straits, Siam, and the Malay Archipelago, a proportion of whom return sooner or later to their homes in Teo-chew and the adjoining prefectures, it is clear that opportunities for the introduction of the disease into this area from any endemic focus in those countries will increase in proportion to the magnitude of the traffic in native labour, and the possibility of its becoming endemic in China when introduced into so favourable a soil and conditions as the body of a Chinaman and his social conditions are known to be, is yearly enhanced by the importation of fresh cases by returned emigrants. Many cases in which contact with an imported case cannot be proved are, no doubt, really contracted in a community which has already become, in itself, a local centre for the spread of the disease, and such centres being once established, yaws may shortly, if it has not already done so, become endemic throughout this district of Southern China, independently of further accessions from without.

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Ankylostomiasis.

Totti, E. Ueber die Aúrottung der Ankylostomiasis in den Bergwerken von Selmeczbanya (Successful Eradication of Ankylostomiasis in Hungarian Mines). *Therapie der Gegenwart*, vol. lxv., No. 7.

DILATATION OF STRICTURE IN THE HYPNOTIC STATE.

By C. W. Branch, M.B., C.M.
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Hypnotism is unfortunately not yet so recognised by British practitioners, especially in the colonies, as to make operations done with its assistance commonplace. In any case, it is probably only rarely that a subject can be trained to a satisfactory anæsthesia for prolonged operations, though for short operations it is always worth while trying to hypnotise the patients.

The following case is remarkable as illustrating complete anæsthesia without training. It also instances the value of hypnotism for subsequent dressings, or other interference after operation.

Fortune Gibbon, black, aged 50, was admitted to the Colony Hospital, St. Vincent, suffering from perineal fistula and stricture. He complained of lumbago and is very deaf. The site of the stricture could be felt as a hard knot on the urethra, the size of an acorn.

On the evening of admission he was hypnotised in bed. Explanations were shouted to him and he gazed at the finger-tip for less than a minute. When influenced he was found to be hearing well, if not actually naturally. Suggestions were made for good sleep and relief of lumbago. Next day on the operating table he was hypnotised by persuasion and stroking the forehead for a few seconds. After some trying a filiform bougie was at length introduced, and from that progress was made up to the Holt's dilator. The stricture was forcibly dilated and a No. 12 silver catheter tied in. As the rod of the dilator was driven home there was the slightest twitch of the patient's body. He lay perfectly quiet and asleep according to suggestion. He felt nothing and remembered nothing. By suggestion all after-pain in the perineum and bladder was prevented. Attempts to move the bowels by suggestion failed and there was in consequence some pain from wind. Each time the catheter was changed the patient was hypnotised. A gesture and a word sufficed. One attempt to remove the catheter without hypnotism was complained of loudly. The patient was discharged well in a week.

By good luck this was a very susceptible subject, who readily fell into the degree of somnambulism. His speech was quick and alert and his hearing good during hypnosis, and he had no memory of the incidents of the hypnotic state.

Intestinal Mucus.

Lorentzen, C. Untersuchungen uber Schleem in Stuhl (Researches Concerning Mucus in the Fæces). *Archiv. f. Verdauungs-Krankheiten*, vol. x., No. 3. —Mucus occurs in all stools, being macroscopically evident in health, and excess indicates catarrh of the intestine.

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THE

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THE PARASITOLOGIST IN TROPICAL MEDICINE.

THE importance of a knowledge of parasitology in general medicine is increasing, and in the department of tropical medicine it has already become an essential factor in the equipment of the tropical practitioner. New varieties of parasites are described with almost every freshly explored area, new species are frequently recorded, and occasionally even new genera. The relationship between the diseases of domestic animals and man is engaging attention to an extent scarcely dreamed of some ten years ago, and the parasites which transmit the ailments from animals to men have to be studied as to their geographical distribution, their habits, their food, the continuance of their species—in fact, their complete zoological history. It may be there are no diseases which men and animals do not suffer from in common, and although only a few have been recognised so far, the number is being rapidly added to, and with each fresh discovery the intimate bearing of the one to the other is brought more keenly home. When one considers what the education of medical students was some short time ago as regards zoology in London schools of medicine and the requirements of to-day, at any rate in tropical medicine, one can readily understand how slowly our knowledge of parasitology must of necessity develop.

We mention the London schools and the London examining corporations especially, for a knowledge of even the rudiments of zoology was not required to obtain the diplomas of these bodies, and the class of zoology, or comparative anatomy as it was usually termed, was therefore an optional subject in the schools. The University of London improved matters, and in the universities of Scotland zoology or natural history was an important and a compulsory subject half a century ago, not only in the medical curriculum, but also for the degree of Master of Arts. These courses were naturally little more than elementary, possessing for the most part an educative importance, yet they served to lay a foundation on which subsequent experiences could be built and added to. Of this department of knowledge parasitology is but a branch, and has become, and is in future to still further become, a speciality of high importance, and with an ever-increasing horizon.

With zoology, however, the training of the parasitologist does not by any means end. Botany in its widest sense must be included, and beyond biology we find many corelated subjects that require study. Meteorology, geology, natural philosophy in all its bearings, bacteriology and public health are essential elements of knowledge for the fully-equipped observer, especially in tropical countries, and last, but by no means least, veterinary science. The range of apparently requisite information grows at an appalling rate and may well serve to cause intending students to hesitate before embarking upon a profession with such illimitable potentialities of required knowledge. As, however, each branch is studied by specialists now-a-days, and as it is their duty to teach and direct

medical men in the particular departments adapted to their calling, there should be no difficulty in so arranging the courses of instruction that a useful and practical knowledge of the essentials of parasitology could be conveyed in the limited time at the students' disposal.

A parasitologist must in the near future be added to the teaching staff of every medical school, and in the schools of tropical medicine a chair of parasitology has become a necessity. The sooner this fact is recognised the sooner are we likely to have the matter mended and a great gap in our education filled up.

CHINESE HYGIENE.

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(*From "The China Medical Missionary Journal," April*, 1903.)

If prolonged national life is indicative of sound sanitation, the Chinese are a race worthy of study by all who concern themselves with public health. Even without the returns of a registrar-general it is evident that in China the birth-rate must very considerably exceed the death-rate, and have done so in an average way during the three or four thousand years that the Chinese nation has existed.

Chinese hygiene is the product of an evolution extending more than two thousand years before the Christian era. There are no Chinese sanitary laws like those of the Mosaic code, but the Taoist religion is largely based on health maxims, though lost among a mass of superstitious absurdities and spirit lore. In the Su-wen, a book which is 2,000 years old, the philosophy of the body and of health is fully developed in the old Chinese way. It defines sanitation as health preservation so as to live to old age. It holds that true sanitation is in conformity with Nature's laws. Every one who attends to these can live to be a hundred years old. The Chinese know that in order to live long they must live moderately. They have two main laws of health which are very comprehensive, namely :—

(1) Restraint of all the appetites.

(2) Cleanliness in house and person.

Regarding the attitude of the Chinese to modern public health measures, it may be noted that their prejudices are strong. The Chinese are a people with a supporting belief in all kinds of drugs, charms, and spells, while their medical methods are empirical and mostly founded on the fancies of the alchemistical religion of Tao. The Chinese drug-shops contain an immense number of drugs and preparations, are the most elaborately ornamental of all shops, and the Chinaman spends a large part of his income on medicines. It is not surprising, therefore, that modern public health measures, which are founded on organised common sense and from which the personal factor of the relation between doctor and patient, with all its fallacies, is eliminated, do not appeal acutely to the Chinaman. He is attracted only by the merest sense of so-called Western civilisation furnished by well-advertised patent medicines and itinerant quacks, in the sacred name of trade. As in diseases the least curable there are the greater number of drugs recommended as cures, so it is with the Chinese who, though ignorant of the real cause of disease, have a proportionately great desire for a multitude of drugs: the Chinese pharmacopœia is the largest in the world. In China, therefore, considerable breadth of view and treatment is necessary in hygienic measures. With an unsympathetic people like the Chinese, sweeping sanitary measures are difficult of operation, and though hygienic conversion is hard, dragooning is still less effective, and any attempt to hustle the East is poorly rewarded. The processes of social evolution can perhaps be studied on broader lines in China than anywhere, on account of its particularly massive and concrete historical records; and the lesson appears to be that in many respects the methods of some centuries of practical experience are frequently confirmed as good by modern science. And it is by following out these methods in a spirit of scientific sympathy, tempered by an accurate appreciation of Asiatic environment, that the best results may be attained.

Food.

On seeing the Chinese house-wife washing rice in the nearest puddle most foreigners exclaim, "What beasts these be!" The observing man, however, discovers that rice is not washed to make it clean, but to free it from the fine particles of starchy matter which, if left, would cause the rice to boil to a glue-like mass. It is the subsequent boiling that effectually protects the consumer from any disease that might have arisen from washing in evil waters. The Chinaman eats and drinks little that has not been subjected to the temperature of boiling water or boiling oil, and is therefore largely preserved from typhoid fever, cholera, and other diseases which are caused by infected food. There is no food infection known which will survive the temperature of boiling water. The Chinaman is not a great fruit-eater. He is such an excellent cook that he prefers foods in which Nature has been improved by art. He abhors raw things as a rule. Raw oysters, for example, the Chinese will not eat, considering them "too cold for the stomach." Except under great stress he drinks no cold water, but always tea made with boiled water, and thus avoids water-borne disease. Regarding disease infection, therefore, the principles which govern the Chinese dietary are true ones.

Concerning the quality of Chinese food, a European would generally say there is no "stamina" in it. Diseases, however, like rickets and gout, which are attributed to disordered metabolism, are conspicuous by their absence among the Chinese. Functional disease of the stomach and alimentary tract are less common than among Europeans, and the teeth of the Chinese are admitted by all to be exceptionally beautiful and good. Look at the clean-limbed, muscular Chinaman of the fields. He is the picture of health

and agile strength as he sings through the hottest or coldest day's work. Singing at work, which is practically universal through China, indicates a vital energy in excess of that required for the labour in hand. The weary worker has no song. A Chinaman planting lush rice-shoots on a summer day, with his bare legs in the mud, sings a pæan of Nature exuberant.

Regarding food, therefore, modern hygiene has little to teach the Chinese while he abides by the principle of eating and drinking nothing that has not been thoroughly cooked. He is apt, however, in a foreign environment to consume aerated waters and other unusual things, and suffers thereby.

Houses.

In a Chinese house the weight is carried on wooden posts; the framework and roof being first erected and the walls filled in afterwards. There are usually plenty of windows and other openings, and in the case of shops the front is entirely open, so that the workmen are practically all the day in the open air. The houses are closely aggregated and the streets as narrow as possible, a condition which tends to cosiness and warmth in winter by keeping out the wind, and cool in the summer by keeping out the sun. This, with their peculiarly warm and at the same time light clothing, is possibly the reason that catarrhs, bronchitis and rheumatisms, which may be attributed to cold, are less common among the Chinese than among Europeans. The Chinese dwelling has plenty of natural ventilation. With regard to sleeping accommodation, the Chinese closely resemble most of the rest of animal creation in getting into a small, close, warm place for sleep. It is probable, however, that impure warm air is less injurious than cold pure air. And during sleep less air is required than at other times; while the body during sleep is more subject to chills. Although bad smells abound near Chinese houses, smell is not a perfect test of unhealthy environment. There is little sewage from a Chinese house, for all excretæ are treasured up in water-tight vessels, in which fermentation is allowed to take place, producing manure for the garden and field.

The houses of the Chinese working classes are, therefore, probably healthier than those of the European working classes. Modern hygiene would require the proper paving of the site and immediate surroundings of the Chinese house, the provision of a curtilage to each house, and greater width of streets. The greatest sanitary evil in China is undoubtedly overcrowding, everywhere admitted to be the worst of all unhealthy conditions, and one that cannot be counterbalanced by other sanitary measures. It is here that modern sanitation is diametrically opposed to the Chinese method of closely herding together, which is the result of an evolution, influenced by a feudal environment, in which the people collected together, mostly within walls, for the purpose of mutual defence against outside marauders.

Disposal of Refuse.

It is in the disposal of refuse that modern hygiene has the least to teach and the most to learn from the Chinaman. The principle of returning ordure and garbage to the soil is the only true and economical one. By this means alone can the energy residing in the soil be conserved. The water carriage of sewage, and its most modern treatment in mass by bacteriological methods, is a crude imperfection when compared with the Chinese method of returning all refuse to mother earth, which it replenishes, and is at the same time purified by the most complete bacteriological processes. The upper layer of the soil is the universal purifier; it is here that the nitrifying and other organisms reside which convert organic refuse into inorganic plant food. Before applying ordure to the soil, the Chinaman as a rule allows it to undergo ammoniacal fermentation in pits and kongs. In this process the complex nitrogenous bodies are broken down into simpler ammonia salts, which is a stage nearer to the formation of nitrates by the nitrifying organisms; the latter being the only compounds of nitrogen which are assimilable by plants. These ordure pits and urine kongs are a characteristic feature of the Chinese landscape, and give rise to the *bouquet de Chine*, which is one of the many sacrifices the Chinaman makes at the altar of agriculture. But besides improving the manurial value, these fermenting pits to a large extent kill any pathogenic organisms that may be present. The fields of China sufficiently demonstrate the great manurial value of human excrement, producing fruit, flowers and vegetables in the highest perfection.

The main problem of sanitation is to cleanse the dwelling day by day, and if this can be done at a profit, so much the better. The Chinese solved the question of economic sanitation long ago. While the ultra-civilised European elaborates destructors for burning garbage at a financial loss and turns sewage into the sea, and also frequently into the water he drinks, the Chinaman converts each into a source of profit by using them for manure. He wastes nothing, while the sacred duty of agriculture is uppermost in his mind. And in reality, recent bacteriological work has shown that fæcal matter and house refuse are best destroyed by returning them to clean soil, where natural purification takes place. On the other hand, the typhoid bacillus, and to a less extent the cholera bacillus, can live and even multiply in polluted soil, that is, in soil holding a larger quantity of organic matter than it can elaborate into plant food, while both cholera and typhoid fever can infect vegetables if infected ordure is directly applied to them. In China these two diseases are less frequently water-borne than derived from infected vegetable food. And in this connection it may be noted that typhoid fever is much more common among Europeans resident in China than among those in the home-lands. This greater prevalence of typhoid fever in China would appear at first sight a strong argument against the principle of returning refuse to the soil, but it is more probable that the fault lies with imperfect details. The native doctor does not disinfect the stools of typhoid fever cases.

Inasmuch as ordure is disposed of by natural principles, there is little real sewage in China, so that there is no need for a costly and elaborate system of drainage. The numerous waterways and the aggregation of the non-agricultural population near them

render artificial sewers to a great extent unnecessary. In the great cities near the mouth of rivers and on the deltas, the numerous tide-flushed creeks perform the function of the sewer. These willow-grown creeks, which form so pleasing a feature of the landscape of the Yangtze delta, when kept clear and deep, so as to be flushed twice daily by the most economical and effective of all flushing apparatus, the tide, are excellent sewers and save much expense of artificial drainage. If maintained clean and clear the creek is a perfectly legitimate and sanitary method of drainage, especially where there is little excremental sewage. And in the construction of these creeks the Chinese are masters of the art of irrigation. The motto of Li Ping, the great Szechuan engineer, inscribed twenty-one centuries ago in the temples among the hills above the Cheng-tu plain, "Dig deep the bed, keep the banks low," is as applicable to the whole of China as it was to the great irrigation works of the Cheng-tu plain.

It is in the construction of house drains and streets sewers in the cities that modern hygiene can be of use. Down the centre of many streets in Chinese cities runs a trough of brick or mud covered with flag stones. Through the many places where the covering is imperfect can be seen a black fermenting mass, whose only chance of removal is afforded by a heavy fall of rain. The street sewers discharge into ditches, which become the most noisome of septic tanks through blocking with garbage. In the cities, also, where agriculture is not the chief occupation of the inhabitants, garbage is allowed to accumulate. When divorced from agriculture, the principle of returning all refuse to mother earth does not flourish happily. Self-interest is the mainspring of good works, and in the cities it does not always pay to remove garbage to the agricultural districts; ordure, however, always commands a good price and a ready sale, and its exploitation in most Chinese cities is a lucrative business.

Prevention of Infectious Disease.

The prevention of infectious disease is the chief function of modern hygiene. Notwithstanding the great mass of recent pathological research, which has been the only real advance that medicine has made since the days of Hippocrates, Jennerian vaccination remains the type of all that is best in preventive medicine. The Chinese, however, anticipated Jenner, for they inoculated with small-pox as a protection against severe small-pox when our ancestors were painting themselves with woad. The Chinese were intellectual giants by comparison in those days. The Chinese have seen most of the great nations of antiquity in and out and still remain a great people. Why has not China gone the way of the rest? The methods of living of the people must be essentially good.

The Chinese do not practise isolation of infectious disease. They have, however, been known to evacuate villages stricken with plague, and they frequently burn the clothing and bedding of persons dead of small-pox and cholera. The methods of modern hygiene, born of a true knowledge of the cause of infectious disease —notification, isolation, and disinfection—will come into play when the Chinese medical man ceases to be a mere drug-vendor and is received into the lap of science. This will take a long time. The Chinese are Platonic rather than Socratic in their methods of reasoning, deductive rather than inductive, and have not that aspect of mentality developed which assimilates the natural sciences readily.

Disposal of the Dead.

The Chinese method of burial compares to advan-
— burial rites

agreeable odour indicates the ε
ing. The coffins are finally buried under a mound of earth or in a bricked tomb, but always above the level of the surrounding land. These are scattered through the landscape and, surrounded as they frequently are by trees and shrubs, usually form a pleasing natural feature.

The absence of cremation among the Chinese is notable, considering its popularity in other Buddhist countries, such as India and Japan.

Clothing.

The materials used for clothing by the Chinese are mainly cotton and silk. In hot weather the men do not wear hats and the workers little more than cotton drawers. The dress of Chinese women is perhaps the most modern in the world; the lines of the figure are rarely shown, though a well-dressed Chinese woman is a model of neatness. In the cold weather they increase the number of garments and wear an outer garment padded thickly with cotton-wool, which is very warm and at the same time light. The children become twice the size in winter and rarely suffer from cold. The cold weather clothing is considerably lighter, warmer, and cheaper than European clothing, and enables them to a large extent to do without artificial heat. Chinese clothing is more hygienic than that of Europeans, excepting the shoes of the women with small feet.

Habits.

In Europe alcoholism is the greatest obstacle to sanitary reform, and the death-rate is more increased by this, and its consequent misery in the course of one year than in ten by all the infectious diseases. Drunkenness is practically non-existent in China. Opium smoking is perhaps the equivalent in China of alcoholism; the sedative effects of opium being more in keeping with the Chinese character than the temporary mental and muscular excitement produced by alcohol which is desired by Europeans. But in comparison with alcohol the evil wrought by opium is trivial. The opium habit is perhaps more nearly equivalent to tea-drinking or tobacco smoking. While alcohol causes diseases of most organs of the body and is one of the chief causes of insanity, opium pro-

duces scarcely any change that can be recognised *post mortem*.

The polygamous marriage system is good in so far as unmarried females are rendered few, and consequently prostitution with its evil train of disease comparatively rare. Concubinage under a strict system must be admitted to be preferable to the flaming prostitution of Europe.

the Chinese. At the present day the thrifty millions of China overflow their own country and compete so successfully with the British and Americans that laws have been made in America and Australia forbidding the immigration of Chinese.

From a hygienic aspect many of the modes of living of the Chinese are better than those of modern Europeans; for example, in the matter of food, disposal of refuse for the benefit of agriculture, clothing, and in the comparative absence of alcoholism and prostitution.

The two ancient Chinese sanitary principles, restraint of the appetites and cleanliness in house and person, are the shortest and most comprehensive summary possible of modern public health rules, including as they do most of what is essential in modern hygiene.

Antiquity in national life is good because it allows evolution to have full development. In social etiquette, for example, ceremonials have been gradually perfected through long periods of time, so that their modes of social intercourse are the most punctilious and refined. In general life it is admitted, by those who have frequent intercourse, that the Chinese gentleman is the most polite in the world. In a somewhat similar manner it is conceivable that the modes of living for the promotion of health have undergone evolution.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

The Plague in India.

The External Affairs Department has received statistics of the plague in India for the year ending April, 1904. The cases numbered 1,232,418, and the deaths 946,410.

Plague.

PREVALENCE OF THE DISEASE.

India.—During the weeks ending August 6th, 13th and 20th, the deaths from plague numbered 4,794, 5,849 and 6,198, respectively. Chief increase due to plague in Bombay districts.

South Africa: Port Elizabeth.—During the weeks ending August 6th, 13th and 20th, fresh cases 0, 0 and deaths 0, 0 and 1, respectively.

Hong Kong.—During the weeks ending August 20th, h, and September 3rd, fresh cases 1, 1 and 3, ths 1, 1 and 3, respectively.

Mauritius.—During the weeks ending August 25th, tember 1st and 8th, fresh cases 10, 7 and 4, deaths and 2, respectively.

Hamburg.—The s.s. *Bishopsgate* was found, on val in Hamburg on September 6th, to have gue-infected rats on board.

Rio de Janeiro.

Population 850,000. Lat. 22° S.

During the week ending July 31st, 1904, the following causes of death were notified: yellow fever, 2; plague, 2; small-pox, 92; measles, 1; scarlet fever, 0; whooping cough, 0; typhoid fever, 2; cholera (morbus and nostras), 0; dysentery, 3; beri-beri, 1; malaria, acute, 3; malaria, chronic, 3; malignant growths, 4.

During the seven months ending July 31st, 1904, the deaths attributable to the following diseases were as follows: yellow fever, 42; plague, 51; small-pox, 1,486; measles, 25; scarlet fever, 4; whooping cough, 21; typhoid fever, 42; cholera (morbus and nostras), 0; dysentery, 36; beri-beri, 78; malaria, acute, 203; malaria, chronic, 69; malignant growths, 128. In the statistics influenza (*grippe*) is assigned as the cause of death in no fewer than 262 instances; surely a remarkable mortality. To pulmonary tuberculosis is accredited 1,427 deaths.

The death-rate from all causes per 1,000 inhabitants is given as 20·29.

Yellow Fever.

Costa Rica.—July 8th to 16th, 1 case, 0 death.

Mexico.—July 3rd to 16th, 14 cases, 1 death.

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Original Communications.

THE FEVERS OF BANGKOK.[1]

By H. Campbell Highet, M.D., D.P.H.,
Medical Officer, Local Government, Siam.

I take it that one of the principal objects of this Society is to encourage original research with regard to the diseases of Siam. I therefore bring before you to-night a subject upon which much work has yet to be done. Ideas, theories, but more particularly facts are wanted before we have the last word on the fevers of this country. It is then with a view, not to lay down the law, but to elicit your opinions, gain the favour of your help and learn new facts that I have prepared these rough notes on the fevers of Bangkok.

By the term "fever" is meant that type of disease which has a definite cause, which runs a definite course, and which shows a rise of temperature as one of the main symptoms of the affection. Malaria, typhoid, small-pox and measles are well-known examples of what one generally means by a fever.

Let us start then with the consideration of

Malarial Fever.

In the city of Bangkok it has been my experience that malaria is not nearly so frequent a disease, nor so severe, as one is apt to think. When one looks abroad and sees that the city is closely intersected with waterways, that the surface is only a few feet at most above the level of the river at high tide, and that pools and collections of water of all sorts abound, it would seem that here we have surely a paradise for mosquitoes of every variety. That the conditions are not so favourable for the propagation of the Anopheles one can soon prove. Culex may be found in every little pool and puddle of water, but Anopheles is distinctly rare in Bangkok. One often reads in the local newspapers that these awful drains built by the Sanitary Department, are nothing but breeding grounds for fever. Well, I have examined hundreds of larvæ from them, and have not yet found anything more troublesome than the ordinary Culex. In April of this year forty-three different sites, extending from Samsen and Dusit Park on the one side of the city to Sapatoom and Saladeng on the other, were examined by me. Drains, small pools of water, broken jars, broken bottles, and, in fact, any place where water could collect and mosquito larvæ develop were investigated, with the result that out of thousands of larvæ observed, not one anopheles was discovered. Further search will be made at frequent intervals, as I have occasionally seen a stray anopheles in town. It may be that after some months' rain, and after the flooding of the paddy fields, more will develop in the outskirts of the town, and may then be found in the town itself.

We have, therefore, in this scarcity of the Anopheles a very good reason why malaria should be so rare in Bangkok.

[1] A Presidential Address delivered to the Siam Medical Society, Bangkok.

Varieties of Malaria.

What forms of malaria do we find here? Well, Bangkok is pretty much like many other tropical countries in that quartan fever is extremely rare. I have not yet seen a case in Siam. Tertian is fairly common. Of fifty-five cases of malaria diagnosed by examination of the blood, 73 per cent. proved to be benign tertian, while only 27 per cent. were of the malignant type. As many of the latter occurred on the persons of the police on the Korat Railway, and were most likely infected in the notorious districts of Muok Lek, the proportion of real pernicious fever arising in Bangkok becomes a very small figure indeed.

What is the seasonable prevalence of the disease? Knowing that it has been definitely proven that malaria is carried from sick to healthy by the agency of mosquitoes, it will at once occur to you that surely the time of the year when there are most anopheles should be the most favourite season for malaria. Is this true or not of Bangkok? In reply, I may say that I do not yet know. It is a point upon which I crave your assistance and co-operation. Anyhow, nearly half of my cases have been met with in January—one of our coolest and driest months of the year. It may be that many of these cases are not of the nature of primary infections, but that the cold nights of December and January have brought to light previous infections. On the other hand, perhaps it is during these months that the anopheles most abounds. Further investigation of this question is required, and may be carried out by you all without any difficulty.

The Clinical Aspects of Malaria in Bangkok.—As I have already shown, the large majority of cases seen by me belong to the simple tertian type. It is needless for me to describe to this Society the symptoms of a classical malarial attack with the initial rigor, the hot stage, and the stage of perspiration followed by a condition of apyrexia until the time for the next rigor should come round. Some of my cases were fairly typical, but the majority did not suffer from actual rigors. Some felt slightly chilly, others only felt out of sorts and somewhat warm before the attack. In many of the cases, the rise of temperature took place in the morning, in others about mid-day or early afternoon. You will see this from the charts of simple tertian which I have prepared. These are typical cases of single infection, all of which had suffered from fever for a few days before coming into hospital. As my rule is to give all cases of fever a simple purge to start with, and no quinine until the blood has been examined and the case has been watched for a couple of days or so in order to note the actual curve of temperature, it often happens that spontaneous cure of the fever results in our hands. It would seem that the action of the purgative, combined with rest in hospital, gives the *vis medicatrix naturæ* a chance to kill off the plasmodia in circulation. I have actually seen on many occasions the blood become free from malarial organisms without a single dose of quinine having been given.

Cases of double tertian, where one has two generations of plasmodia maturing on alternate days, give one more trouble, however, and often at the outset present considerable difficulty in diagnosis. Look, for

example, at the chart of double tertian infection, and you will see that unless one had definitely proven the presence of malaria by examination of the blood, some doubt might justifiably have been held as to the nature of the fever. The blood was examined on the 21st without any result, and so no quinine was given. As there had been some discomfort about the spleen, and as the symptoms did not point definitely to typhoid, I again took specimens of the blood on the 23rd, and then found simple tertian parasites, but very few. Quinine was started on the 24th in five-grain doses, twenty grains in all to be given during twenty-four hours. The groups of parasites which had already been shed from the sporules on the 23rd were not affected naturally by the quinine given on the 24th, but the young forms of the 24th, and those of the 25th, seem to have been nearly all killed, for on the 26th the temperature only rose to 99°, and then remained normal or subnormal. This sinking of the temperature to subnormal is rather interesting. It has often been said to be due to the action of the quinine, but I do not think that this is the only cause. Consider the following case. He had no quinine until the 3rd June, and yet on the 1st June his temperature fell to 96°, and to 97° on the evening of the 2nd and morning of the 3rd. You will see the same drop of the temperature to subnormal points in the typhoid charts which I shall show you. In the latter one might consider that the subnormal temperatures were the result of a certain condition of collapse, as no doubt they often are; but, on the other hand, I have seen these subnormal temperatures in typhoid and malaria with quite strong pulses. What is it then that lowers the temperature so much? One might advance the theory that in strong patients an antipyretic toxin is secreted, that this counteracts the fever, but that it is usually thrown out in excess. This antitoxin has easily overcome the fever producing toxin, but, being secreted in excess, its depressing effect continues for a few days until it ceases to be secreted, hence the subnormal temperatures.

Complications and Sequelæ of Tertian Fever.

As yet the only interesting sequelæ of tertian fever has been a case of acute mania, of which the following are the notes :—

Nai Suk was brought to hospital late on the evening of January 5th, for observation as to his sanity. There was a history of severe fever for ten days or so, but he had been free from fever for five days previous to admission. Being transferred to the Paknam district, he went there on January 4th, apparently quite well, but no sooner had he arrived there than he telegraphed to headquarters that his life was threatened.

He returned the same evening to Bangkok, and on arriving at the house of some relatives he was suspected to be mad, as he talked nonsense and behaved in a very peculiar manner to all his friends. Later on that night he seized a knife and ran out of the house, and upon being followed he attempted to stab a relative. He was then seized and brought to the police-hospital. I saw him the following morning, when he seemed quite sensible again. As he was very anæmic and had an enlarged spleen his blood was examined, and sporulating tertian forms were found in rather large numbers. Although there was no rise of temperature, these sporulating forms persisted for a few days, but soon disappeared under the influence of quinine. He went out quite well and has remained well ever since.

This case might be classified as a case of post-febrile mania, such as one sometimes sees after typhoid and other fevers, and in which anæmia seems to play a chief part in the etiology of the cerebral disturbance.

Complications of Pernicious or Æstivo-Autumnal Fever.

Coma has been seen by me in two cases which proved fatal.

The case of Nai Inn, No. 896, was a very striking one. On admission his appearance closely resembled a case of cholera in the stage of collapse. He was unconscious, his skin was bathed in cold perspiration and with the characteristic features and washerwoman's fingers; there was loose, watery diarrhœa. There was a history of some days' fever up the railway, and the internal temperature registered 103°. Immediate examination of the blood revealed the presence of numerous æstivo-autumnal parasites. Quinine, brandy, and strychnia were given regularly from the start, and as the diarrhœa soon stopped, nutrient enemata were also administered. He never regained consciousness, and died on the third day after admission. At the *post-mortem* examination, the typical appearances of death from pernicious malaria were observed, such as you have seen in the specimens under the microscopes. This case had high fever, but that there may be coma without high fever is seen by reference to the case of Nai Unn, No. 10/123, who was admitted moribund with a history of fever for many days. The temperature was only 100° on admission, and even fell to 98° after repeated small doses of calomel and quinine. It rose to 101° on the evening of the third day in hospital, but he never rallied, remained unconscious until the morning of the fourth day, when he died. Here, again, *post-mortem* examination verified the diagnosis of malarial coma, as you have seen in the preparation of the brain.

Treatment.—As I have already said, many cases of true malaria get well without quinine, apparently the result of change of diet and scene, combined with rest. Phagocytosis is encouraged, and the plasmodia in the circulation are destroyed by natural means. In simple tertian, small doses are generally sufficient to effect a cure. Most of my cases get no more than ten grains daily, but the quinine is to be continued for ten days in gradually diminishing doses after all fever has gone and after all plasmodia have disappeared from the circulation.

In æstivo-autumnal fever, small doses of quinine are not usually sufficient to cure, but that they may do so is seen by looking at the chart of Nai Chune, No. 758/122. In such cases, however, it is always safer to give at least fifteen grains of quinine daily in order to ward off any risk of severe complications. In coma give intramuscular or even intravenous injections of one of the more soluble forms, such as the hydrochlorate. For hyperpyrexia, the cold pack or the cold bath is naturally indicated. Unless such

cases are submitted to treatment at once, the prognosis is always grave. Bleeding might in some cases be of advantage, as it would at least get rid of many infected blood-cells and would relieve tension in the brain.

Typhoid Fever.

It is interesting to note that the recognition of this disease in Bangkok has developed in exactly the same cycle as in India and in other tropical and sub-tropical countries. The first phase was absolute non-recognition, and all cases of continued fever were called malaria. Next, with the help of greater experience and it may be with more correct methods of diagnosis, a doubt began to arise in the minds of our colleagues that many of these cases of fever were not pure malaria. Some of them failed to give way to the effect of quinine, many of them passed through a definite period of twenty-one days; and such cases often showed, not only during life, symptoms rare to malaria, such as hæmorrhages from the bowels, but on *post-mortem* examination there was noted a set of lesions peculiar to these cases—lesions which pointed to typhoid fever rather than to malaria. Doubts still existed, however, and these were dubbed typho-malaria, a title well known to me when I first came to the East.

Soon the dawn of a new era arose. The microscope, first in Laveran's hands, became the certain means of demonstrating the *plasmodium malariæ*, the one and only cause of malarial fever, while bacteriology developed until we now possess the serum-diagnostic test for typhoid fever. With aids such as these, it was soon demonstrated that while on rare occasions malaria and typhoid might run synchronously, there was no such entity as typho-malaria, but that each disease was a definite one, and not only were they rarely associated together, but could be diagnosed the one from the other with perfect certainty.

In passing it may be stated, as a rough method of diagnosis when the use of a microscope or the help of a serum-diagnostic test cannot be obtained, the administration of twenty grains of quinine daily for three days will, as a rule, settle whether one has malaria or typhoid to deal with. Very few cases of malaria fail to react to such doses, but the fever of typhoid will be practically uninfluenced by the quinine. I have often verified this method by the microscope and the serum-reaction, and can thoroughly recommend it as a rough method of diagnosis.

It may be taken for granted then that typhoid fever does exist in this city. I have seen cases since early in 1897. When one considers the usual conditions which favour the distribution and growth of the *Bacillus typhosus*, only a slight acquaintance with Bangkok should, on *a priori* grounds, convince us that this disease must be prevalent. We have all the conditions favourable to its development, such as defective drainage, a polluted soil, a contaminated water supply, a high level of subsoil water, everywhere heaps of household refuse, and innumerable flies to carry about the contagion.

In my experience, the periods of the year when the disease is most prevalent have been July and December. Half of my cases have developed during June, July, August or September.

Time of Prevalence.

In November I have not yet recorded a single case. The seasonable curve seems to fall to zero in November, but rises abruptly in December, falls again in January, and remains fairly stationary until June.

Now, is there any reason for this apparent anomaly? I regret that I must base these tentative conclusions on no more than a total of thirty-seven cases. It may be that further experience will alter the whole sequence of events. I look to you, my colleagues, who are members of this Society, to assist me in elucidating this point.

Firstly, then, is there a climatic cause for this increase of cases during June to September and again in December?

Summer Prevalence.

Looking at the chart which I have prepared of the meteorological conditions in Bangkok throughout the year — the records have been taken by myself and I can vouch for their accuracy —What do we find? We note that the mean of the maxima is steadily falling after the hot dry weather of March, April and May. The mean of the minima is at about its highest, but the mean of the whole daily temperature taken from five separate daily records is less by four to six degrees than the previous month or two. From these data, however, we gain no definite information, but from the figures for rainfall, some deduction may be safely drawn. It will be seen that the rains, starting as a rule in May, continue until well on into October to give place in November to the dry north-east monsoon. It may be said, therefore, that the greatest number of cases of typhoid fever seem to follow shortly upon the advent of the rains and to continue until they are nearly over. Surely at first sight one might think that this was quite the opposite to what it should be. There would seem to be plenty of rain water to be had, and falling as it does from the heavens, one might expect that it would be free from contamination. Alas, however, as with most things on this earth, one is limited, one has to resort to a compromise. The usual method of collecting the rain water is from the roof of our dwelling houses. These roofs have undergone a steady process of pollution during the dry months with dust, soot and bird's droppings, and I can assure you that as a result of many analyses of such samples of rain water, I find that it takes a steady three or four weeks rainfall to clean them. Here then it may be we have a fruitful source of infection.

Another source is the washings of the soil poured down into all our canals and streams by these first few months of rain. These canals as you all know are not only our common sewers but they are also practically the sole source of drinking water for the people who live along their banks or in their vicinity. Can it be wondered at that the early rains should intensify the foulness of the ordinary klong water when one thinks of the ubiquitous collections of filth and rubbish that abound in Bangkok. It may be granted then that climatic conditions favour the outbreak of typhoid fever, especially during the early months of the rainy season.

Winter Prevalence.

What is the reason for the second increase during December? It may be that with a larger series of cases this will not be maintained, but even as it is it may be remembered that water plays an important part. During November and early in December, we experience very high tides. These result in raising the level of the subsoil water to that of the surface of the ground, the canals overflow their banks, wells are flooded and a general soaking of the soil with sewage from the canals is the consequence. As the period of incubation of typhoid fever may extend from eight to twenty-three days, it is evident that the incidence of the disease should be more marked in December than in November. Such is the seasonal incidence of the disease in Bangkok so far as we know at present.

Sources of Infection.

How is the infection conveyed? In other countries the general consensus of opinion is that this is par excellence a water-borne disease. Bad or inefficient drainage, or in fact anything that leads to contamination of the general water supply, tends to spread a disease. Are not these conditions most evident in Bangkok, and in fact have they not already been described? Pettenkofer's theory that in Europe epidemics are most common when the ground water is low and when springs and water courses drain more thoroughly and therefore become more contaminated, is not in my opinion antagonistic to the fact that most of the cases noted by me arose during the rains. The condition common to both places is that the water supply becomes polluted. Where Pettenkofer's experience was obtained, wells are largely the main source of supply, whereas in Bangkok there are few wells, but the ordinary klongs or canals take their place. As I have already shown these klongs are most polluted by the washings of the soil caused by the first of the rains, hence the fall of the subsoil water here has little effect as a causative agent.

After water comes food as a conveyer of the *Bacillus typhosus*.

In Europe, where milk is so largely consumed, many epidemics have been traced to a polluted milk supply. In Bangkok, however, milk is rarely drunk except by Europeans and Indians. The ordinary Siamese or Chinese do not drink milk.

In my own experience, after considering carefully the means of conveyance of the infection, I was forced to fall back to the milk supply in the case of several Europeans. This led to a general inspection of the Bangkok dairies, and so much filth and uncleanliness was discovered that the wonder to me was that anyone drinking the milk from such sources could escape the disease. Some of the dairymen naïvely remarked that they always washed the milk bottles with pure water. Samples of this pure water were obtained and on analysis were found to be nothing but diluted sewage—a most excellent medium for the growth of the typhoid bacillus.

Again, shell-fish are known to be frequent carriers of the bacillus, and one might well believe that oysters taken from the estuary of the Menam would be very liable to be polluted.

The ordinary food of all sorts displayed in the markets is even more likely to be contaminated through the agency of flies. I am certain of the fact that in three cases of cholera at any rate attended to by me, the infection was carried by flies, therefore why not typhoid as well?

Symptomatology of Typhoid Fever.

So much for the etiology of typhoid fever, let us now consider a few points with regard to the symptoms and see where tropical typhoid differs, if at all, from that met with in temperate climates.

The mode of onset has generally been as insidious as in temperate climates. Severe headache and sleeplessness have ushered in most cases, and in a few I have seen a well marked pharyngeal catarrh with perhaps some bronchial catarrh as well. The temperature has not always risen in what used to be considered the classical manner—that is, with the evening readings rising daily a degree or so higher until it reaches 103° F. or 104°. In both there had been fever for a few days before it was commenced to be taken regularly, and the fall may have been due to the action of antipyretics acting more powerfully in the early period of the fever. Another point to notice is the great oscillations of the temperature curve, in some of these cases even as early as the beginning of the second week. Look for instance at Chart 8 and you will notice that on the morning of the seventh day of the fever the temperature at 10 a.m. was 97·8° F., and so on until the twentieth day of the disease, normal or subnormal records were obtained in the morning whereas the evening temperature did not touch normal until the fifteenth day of the fever. Now with a chart like that in a patient who has no definite physical signs except slight enlargement of the spleen and rather a foul tongue and one or two spots—doubtful rose spots at that—on the abdomen, with constipation and not much gurgling in the right iliac fossa, I have no doubt that some of you will not agree with me in my diagnosis of a mild type of typhoid fever. Remember that in the case just alluded to malaria, liver abscess, tuberculosis were all carefully excluded, so what else would you call it but typhoid? The patient was under no medicinal treatment whatever except the daily administration of a glycerine enema. Only liquid diet was permitted, she was kept strictly in bed, but with all our care a relapse occurred on the seventeenth day after the original fever had broken out. The second bout of the fever was, as one so often sees, a more serious affair than the primary attack, it followed more closely the classical lines of typhoid, and during the second week, the temperature remained persistently at or above 104° F., necessitating repeated sponging with tepid water to keep it in check.

Gentlemen, I know of no other disease which could give us such a picture. It shows us that with even apparently mild cases, one must be extremely careful in treatment. The relapse was due in this case not to any error in diet but to a mental shock about the fifteenth or sixteenth day of the fever. The duration of the fever until the evening temperature touches normal may vary from ten to fifteen days up to twenty-

two days, the classical time, as in case 9, or again the normal may not be reached for thirty days as in case 10, and even forty-two days in case 11.

Cases 10 and 11 are distinctly interesting to look back upon now, but at the time they were most tiresome, dreary and uninteresting. Case 10 was the original patient, and case 11 was his nurse, who apparently contracted the disease from her patient and began to sicken just as his temperature was reaching the normal. I remember well when diagnosing typhoid in the nurse, being asked by her if I thought that she would be as long over it as her patient. I told her that the probabilities were all in favour of a long-drawn-out case of a mild variety in every other respect, but I must own that I never expected forty-two days of fever.

What is the reason of the disease being so prolonged beyond the ordinary twenty-one days? Some authorities state that these are cases of intercurrent relapse. They may be so in some cases, but in these two I am sure that you will agree with me that the charts show no signs which would bear out such an hypothesis. I would rather incline to the view that it is due to a definite peculiarity of the special culture of the bacillus which infected these people.

Persistently high temperature may be met with from the very outset of the disease in some cases, but in these patients mental symptoms came on very early and they are almost hopeless from the first.

Relapses occurred in three cases and proved fatal in one. The relapses were always more severe than the initial attack, and in one a fatal termination nearly occurred from intestinal hæmorrhage.

Fever of Convalescence.

I have already shown that in malaria as well as in typhoid the temperature is apt to be subnormal during convalescence. In the latter disease, the theory of an antipyretic toxin might apply, but the greater likelihood is that the fall is due to exhaustion. In other cases, however, there is to be seen a slight daily rise of temperature even after the patient is able to be up and about a little. This is due in some cases to the resulting anæmia, and probably in others to nervousness, for in the latter case if one lets the patient get out of bed, stops taking the temperature and orders a change of diet, the slight fever passes away.

Another form of fever during convalescence is of a far more alarming nature. It is the sudden jump to figures such as 103 or 104° F. Its very suddenness, however, shows that it is not a relapse, for then the fever steadily rises as a rule. I remember how one of my patients, rather a nervous man of middle age, got a dreadful fright one day when he found that the thermometer registered 103·2°. His temperature had been normal morning and evening for three days, and as he was quite well otherwise with the exception of being rather more constipated than usual, I ordered a dose of castor oil. This he did not take but tried an enema the following morning. As the temperature remained up and as the tongue was not so clean, I persuaded him to take the oil. The result was a free and copious evacuation and the rapid fall of the temperature to normal. These sudden rises are due to constipation or to slight digestive trouble, often the result of over feeding. Care in not increasing the quantity or quality of the food too soon and attention to the bowels are the best prophylactics against these accidents.

The Condition of the Alimentary Tract.—The tongue in these mild cases has often remained remarkably clean and moist throughout the whole duration of the attack. A whitish central fur with red edges and tip is often seen at the onset. In the relapses the typical tongue was met with. Gurgling in the right iliac fossa was usually present, but tympanitis was not seen except in the case which presented hæmorrhage during the relapse and in the relapse which ended fatally.

Constipation of even an obstinate nature was the rule. In the few cases, typical pea-soup motions were present, but in no case did diarrhœa give any trouble.

Rose spots on the abdomen are not so common in the tropics as in temperate regions. They are very often absent or when present are very few, three or four at the most. In one case, however, I noted a sharp eruption of spots on the sixth day of the fever. They appeared not only on the abdomen and lower part of the chest, but also on the neck, face, forehead and left forearm. They were rather deeper red than the typical rose spot, and were petechial and paled for a moment on pressure. They all appeared within two days and then gradually disappeared. Mosquito bites and prickly heat often render the search for rose spots practically impossible.

The Death Rate.—Of 16 cases amongst Europeans, to my knowledge 4 cases have ended fatally, giving therefore a death rate of 25 per cent., a considerably higher figure than that for England, which is 12·5 per cent., and rather lower than the death rate in India, which has been calculated at 33 per cent. Our death rate agrees pretty closely with that of Hong Kong and China ports, and shows us that although many of these cases look very mild and simple, one is dealing with perhaps the most treacherous disease known, and no case is safe until all fever has been gone for some weeks.

Diagnosis.

The Diagnosis.—Although for some days after the patient has consulted one, there may be a reasonable doubt as to the nature of his fever, this is one of these cases in which one should never hesitate to give the patient the benefit of the doubt. No matter what the disease turns out to be, you will only do good by treating a suspicious case as one of typhoid. Considering the treacherous nature of the disease, these few days of proper dieting and rest in bed which you have gained may well have turned the scale between life and death. My experience is that when a patient complains of having been out of sorts for some days but has nothing definite except headache of a dull steady character with sleeplessness, has fever of 100° or more in the morning, and 102° or more in the late afternoon, with a dry hot skin and with no remission of the temperature to normal the following morning, has a tongue slightly furred in the centre with red

edges and tip, has already a sallow, dirty complexion, and a slowish somewhat dicrotic pulse, suspect typhoid and at once proceed by careful examination to eliminate any other diseases which might produce such a syndrome.

Malaria is as a rule easily eliminated, for with it one does not see the same picture of being so ill at the very commencement of the disease. Chills are complained of in malaria but not often in typhoid, and remission of the fever with sweating is the rule even in double infections or in æstivo-autumnal cases. In speaking of typhoid fever and its recognition, I have already shown that the administration of quinine in daily doses of twenty grains is an excellent diagnostic test. No case of malaria has yet failed to react to these doses administered for two days, whereas with typhoid, the headache seems to be exaggerated and the temperature does not fall. Microscopical examination of the blood will clinch one's diagnosis at once. I say nothing of enlargement of the spleen, as it is common to both diseases. Finally, typhoid is a much more common disease among Europeans in Bangkok than malaria.

Acute Hepatitis and commencing *liver abscess* may simulate typhoid, especially the latter, but a few days' close observation will settle the doubt. Night sweats, foul tongue, and hepatic enlargement will point to the liver being the cause of the fever.

Slight Pneumonic Symptoms may usher in an attack of typhoid, but one soon finds that although the lung condition rapidly clears up with rest in bed, the general state of fever does not improve if the case be really one of typhoid.

Cases of *simple fever* due to intoxication from the gastro-intestinal tract may perhaps simulate typhoid, but the initial calomel or castor oil purge which I invariably give, will cure the one but will have no appreciable effect on the other.

Finally, in the course of a few days the serum reaction may be obtained, and in Bangkok I can assure you, Gentlemen, this test has generally verified the diagnosis just as well as in other countries. I would emphatically warn you, however, not to wait until you are armed with the very definite confirmation which Widal's reaction imposes upon your diagnosis, for I repeat again, give the patient the benefit of the doubt and you will never regret it.

Treatment.—As there is not much more time left at my disposal, I shall just say a word on this point. Rest in bed, milk, rice-water and clear soups, a preliminary purge of calomel followed by castor oil if necessary, and daily attention to the bowels if there be constipation, by means of glycerine injections, are the main lines of treatment. No medicine is required, but when the temperature rises to 102° I always advise sponging with tepid water. This cools the patient and has such a soothing effect that he generally sleeps afterwards. In hyperpyrexia I employ the cold bath or ice pack, preferably the latter if the patient be too weak to be moved out of bed. No solid food is allowed until the temperature has been continuously normal for ten days, and then one starts with weak corn flour, thin bread and butter, &c. On the tenth day, if all be well, the patient is allowed out of bed on to a long chair for an hour or so. To complete a cure a sea voyage is recommended, and my experience has generally been that a patient so returning after an attack of typhoid fever is in a far better state of health than he has been in for years.

Of the other fevers of Bangkok very little need be said to a Society such as this.

Small-pox,

although fairly common, has not much tendency to become epidemic, owing to the fact that the protection afforded by vaccination is nowadays largely taken advantage of by the general public. Another reason for its not being epidemic is that a large proportion of the adult population, especially amongst the Chinese, is protected by a previous attack of the disease. When inspecting coolies on an incoming ship it is remarkable to note how many are pock-marked.

In the out-lying districts, however, severe epidemics of virulent small-pox are by no means unheard of, although the Siamese Government is doing a good work in sending out public vaccinators. If the new vaccine station established in Bangkok turns out a success great benefit will accrue to the country.

As for the annual number of the cases, I can give you no figures either for Bangkok or for the provinces. In the absence of a law for the enforcement of the compulsory notification of infectious diseases, much valuable information is lost to those of us who have to do with the care of the Public Health. I hope to see the time when such a law is in force and when a hospital for infectious diseases has been established in Bangkok.

Measles.

This is another common form of fever in Bangkok, but presents no remarkable difference to that seen in temperate climates. As one would naturally expect, the pulmonary complications and sequelæ are happily very mild in the Tropics.

Scarlet Fever.

I have never seen a case of this disease either here or in Singapore. It is said to occur in India but rarely. In Hong Kong, cases are from time to time reported but these usually arise in young Europeans on ship-board, especially amongst the freshly arrived midshipmen and blue-jackets; it is strange that this disease should not spread even although cases are continually being introduced, as in Hong Kong.

Typhus Fever.

One might expect to meet with this disease amongst the Chinese population here, but personally I have not seen a case.

Dengue Fever.

This is not endemic in Bangkok, but many of you will remember the extensive epidemic which started here in December 1901, and lasted for nearly five months. I believe that quite 70 per cent. of the whole population suffered. Typical as well as atypical cases were noted and many persons had actually one and even two relapses. The death rate was *nil* so far as I could find out. I did not verify one or two cases of supposed death from this disease, which if not dangerous to life is, and I judge from personal experience, one of the most painful affections that one might suffer

from. Many persons were actually crippled for weeks and even months by the muscular and joint pains.

Mediterranean Fever and Kala-Azar,

although seen in India, especially the latter, have never been met with here so far as I know.

As for the various forms of so-called "*unclassified fevers*," I cannot say that I have yet come across one of these types which satisfies my definition of a fever. Those which are specific in nature are, I am sure, nothing else but typhoid. The cases of simple continued fever which one gets here are multiple in their etiology. Most are due to infection from the bowels and a good dose of calomel or castor oil is the best cure for them.

Low Fever,

however, may be a definite entity, but I have my doubts. It is, as a rule, only found in Europeans in the Tropics. I can corroborate Manson, who writes thus of this fever: "Its characteristics are indefinite duration—weeks or months, a persistent though slight rise of temperature—rarely above 101·5° never below 99·0°, anorexia, loss of flesh, and a tendency to bilious diarrhœa. It is unrelieved by quinine or arsenic, but it almost invariably responds to a change of air, especially to a trip to sea." The only point where I differ from this description is on the question of the temperature, which I have often seen normal in the morning. In these cases one will generally find a foul tongue, usually some enlargement of the liver and even tenderness over that organ. There is in fact a condition of chronic congestion of the liver with at first, it may be, increased flow of bile; later on the diminution of bile is shown by the pale and very offensive stools. Repeated small doses of calomel or of mercury with chalk, liver tonics, especially those containing nitro-muriatic acid and taraxicum, and wet packs over the liver frequently do good for a time, but only a change from the locality can bring about a permanent cure. That this disease is peculiarly due to local conditions of some sort is proven by the fact that in most cases the temperature begins to fall within twenty-four hours after crossing the bar.

In conclusion, Gentlemen, I would plead most strongly for a more accurate and scientific study of the so-called unclassified fevers. There may be some fevers which have not yet been recognised, and it rests with you all to assist in their discovery and study. We do not know what *rôle* is played by the peculiar bodies which Leishman and others have found in the splenic juice. Whether they are trypanosomes or not has not been decided. I have searched for them here but have not yet come across them even in likely cases of enlarged spleen. It may be that a trypanosome, different to that which is said to cause sleeping sickness, exists in the blood in natives of India and other places, and causes fever for which there is yet no name. I have come to suspect that this may be the cause of a disease which one now and again sees in Siam, a disease characterised by patches of local œdema of the skin and subcutaneous cellular tissue with slight fever. Trypanosomes have not been found as yet in these cases, but I have always observed a state of marked eosinophilia. There is a wide field open for research here, and I trust that the members of this Society will not lag behind their colleagues in other places as investigators of the local diseases.

BERI-BERI IN SOUTH AFRICA.

By L. E. Ashley-Emile, L.R.C.P., L.R.C.S.Edin., L.F.P. and S.Glasgow.

Mopea, Zambesi River, East Africa.

Reading an account of the outbreak of beri-beri among the recently imported Chinese into the Transvaal, reminds me of some cases, about 200 in all, which I had the good fortune to observe while in medical charge of the North-End Camp at Port Elizabeth, Cape Colony, during the South African War, from January, 1900, to August, 1902. At the present time, when this subject is of such vital interest to the prosperity of the country, I am sure all information will be welcome; for, on referring to the literature on the subject for the past four years, no previous mention of the existence of beri-beri as an endemic disease of South Africa, appears to have been published. So I venture to give a brief outline of my experience for further elucidation of the subject.

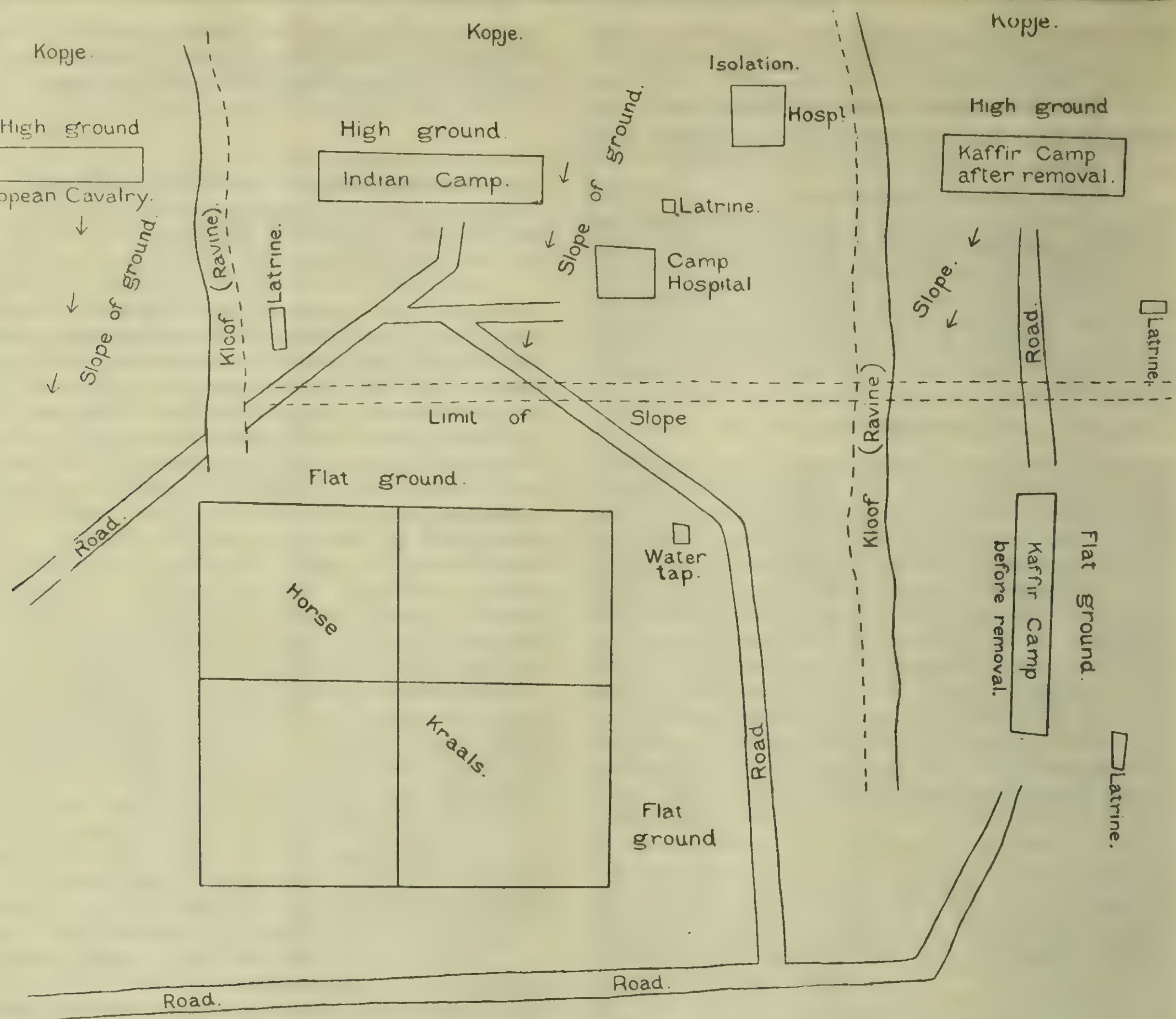
A disposition of the various camps, and their relative position to each other, is of importance from an etiological point of view. In the accompanying plan it will be observed that the Indian Camp, consisting of 750 troops and followers, was located on a slope at the base of a kopje (hill), on perfectly dry soil of ironstone, shale, and limestone, mixed with sand, and having scarcely any turf, well raised above the plain, facilitating drainage and assuring perfect dryness of soil during the rainy season of the year, from October to January. A kloof (ravine) separated the Indian from the European Cavalry Camp, which was also situated in a similar position.

The Kaffir Camp, with its 800 to 1,500 occupants, was in the first instance located on flat ground of clay and dense marls covered with turf and other vegetation, and for the most part water-clogged, owing to insufficient undulation, the subsoil water attaining a very high level and maintaining a dampness throughout the year.

In consequence of an outbreak of beri-beri and dysentery among the men, it was considered advisable to remove the camp to a higher level, having a ravine between it and the other camp, which was effected without any diminution in the number of beri-beri admissions.

Overcrowding.—Every care was taken to prevent overcrowding as much as possible in the Indian Camp; four men usually occupied a single tent, while the number was limited to eight in the Kaffir Camp, owing to the latter not possessing any furniture.

Habits and Mode of Life.—The personal habits of the two races differed vastly. The Indians, accustomed to luxury and comfort, slept in beds made by themselves from army biscuit boxes; they were well provided with warm clothing, bedding and boots, the latter a most necessary article. The Africans were better paid, and not provided with any clothing, &c. Their usual kit, consisting of a suit of clothes, worn



while at work and immediately discarded on returning to camp, and their customary blanket substituted, in which they slept on the damp ground. While at work both races associated together, were treated in the same hospitâl, but in different tents ; they mixed freely in the open air, but never occupied the same tent, hence they were never in close personal contact; yet not a single case occurred among the Indians.

Particular attention was paid to the sanitary arrangements of both camps, and carried out under insuperable difficulties, necessitating constant supervision ; for not only were there the elements to contend against, but the dirty habits of both races had to be combated ; where the coolie and Kaffir are dirt becomes superabundant.

Fatigue parties, instituted and in charge of responsible men, attended to the cleanliness of the tents, the rolling-up of tent flaps every morning in order to admit as much air and sunlight as possible, as well as the collection and destruction of all refuse. Separate latrines existed on the pail system, with daily removal of contents, the pails being removed and replaced by fresh ones after disinfection with lime and carbolic powder.

Diet.—Flour or rice, dhal (split peas), fresh vegetables, ghee (clarified butter), sugar, tea, a daily allowance of lime juice, and mutton once a week, formed the Indian diet; the Africans purchased their own food, which consisted of mealie meal (Indian corn), porridge, and loaf bread occasionally. The former were temperate in their habits and abstained from alcoholic drinks, the latter devoted most of their salary to "Kaffir beer" and other intoxicants. Potable water supplied to both camps was of excellent quality, and derived from the same source as that supplied to other parts of the town.

Previous History of Cases.—On taking charge of the Camp Hospital, I was surprised to see a number of Kaffir patients with swollen legs, who complained of pain in the pre-tibial and calf muscles, and difficulty in walking; as usual these cases were mistaken for muscular rheumatism, and only when the number of admissions increased was a diagnosis of beri-beri made after much hesitation, as at that time beri-beri was unheard of in Port Elizabeth. On making inquiries from the men the following history was elicited, viz., that a similar disease with swollen limbs, accompanied with painful locomotion, first appeared

among the Kaffirs employed in the Kimberley mines, where the men often slept in the underground excavations, huddled together during the cold weather. Being discharged the men returned to their respective homes in various parts of the Colony and were treated by witch doctors who effected marvellous cures among them, they again resumed work, some in the mines at Johannesburg, others in the docks at Cape Town; the same disease attacked them in both places; on their return home and after an apparent cure, they were recruited by the military and sent to the remount depôt at Port Elizabeth, after the outbreak of hostilities.

Symptoms.—Most of my cases were of the mixed and dropsical varieties. In the early stage, patients sought treatment for swelling of legs and difficulty in walking. On examination the usual signs were present in all the cases, viz., greater or less œdema over the shins, muscular weakness, severe pain on pressing the calf muscles causing the patient to cry out, anæsthesia over the front of the leg, impairment and loss of knee-jerk and tachycardia. During this stage the patients were removed from the camp and sent home. In 1902, owing to martial law and plague restrictions, I was unable to obtain passes for the men, and many passed into the dropsical stage and succumbed to pulmonary œdema and heart paresis.

The dropsical cases, in addition to the above symptoms, presented a helpless condition, inability to raise themselves from the recumbent position, with complete absence of knee-jerk, cardiac symptoms more pronounced, heart dilated to the right of the sternum, apex beat displaced downwards and outwards, hæmic murmurs with reduplication of second sound in the pulmonary area, and in many cases a tricuspid regurgitant bruit was present. Pulse feeble, of low tension and small volume. Dyspnœa and orthopnœa, due to pulmonary œdema and hydrothorax. No albumen was noted after careful examination of urine. Temperature slightly raised, ranging between 99° to 101° F. Œdema was of the hard variety and did not pit well on pressure. Anæmia and spongy gums in a large number of cases, and diarrhœa was one of the initial symptoms.

History of Epidemic.—In reviewing the history of the epidemic, the balance of evidence is not in favour of a local but an extraneous source of origin; with the exception of dampness of soil, the other etiological factors are of insufficient importance in themselves to account for the outbreak; though the camp was removed to a higher situation in line with the Indian and other camps on dry soil, the attacks still continued without any abatement. It goes without saying that the cases were imported and the infection kept up by fresh arrivals periodically, which could easily be the case as the men were recruited and sent down every six months without any previous medical examination. It is quite probable that men arrived at the camp either suffering from the disease in a mild form, or during the latent stage and developed the symptoms subsequently, for according to their own statement a similar disease was prevalent in their kraals at the time.

Area of Infection.—Most of my cases came from various parts of Cape Colony, viz., Indwe, Kingwilliam's Town, Queenstown districts, some places on the Basutoland border and from Basutoland itself. I mention these places particularly, in the hope that many of your readers residing in those and other places, having a large native population, may cooperate in the elucidation of this obscure disease.

Etiology.—As most of our previous knowledge bearing upon the etiology of beri-beri has been obtained in the East where rice forms the staple food of a very large portion of the native population, much attention has hitherto been devoted to rice itself as a potent factor in the causation of the symptoms. Captain Rost, I.M.S., in his important contribution to the literature on this subject, associates rice only as a vehicle through which infection takes place, and not the real cause, which is an angular diplo-bacillus present between the starch granules in rice of inferior quality, and in rice water liquor made from it. Since rice does not form part of the African diet, the germ must be present in some other cereal. Is it not probable that mealie meal (Indian corn) of inferior quality and badly brewed "Kaffir beer" kept in dirty kerosene oil tins, are the vehicles through which infection takes place in a similar manner as referred to by Captain Rost. I offer this suggestion to those who are in a better position to investigate the subject. My object at present, however, is not to formulate any special theory on the etiology of beri-beri, but to indicate its existence and wide-spread infection.

New South Wales.—On May 24th, 1904, a plague-infected rat was discovered in Darlington, this being the first one caught in one of the suburbs during the present outbreak. The Health Board, in co-operating with the municipal authorities of Darlington, set to work to cleanse some unclean premises in the neighbourhood. This spot is not far from Abercrombie Street, where infected rats were caught during a previous plague outbreak. The Water and Sewerage Board have consented to fumigate the sewers. On May 27th an employee of the Sydney Harbour Trust, who was handling rats caught on one of the Darling wharfs, was discovered to be suffering from plague, and was in a serious condition. The Harbour Trust have kept a steam tug constantly employed at night steaming the wharves with a powerful steam jet. Some idea of the extent to which the harbour is polluted may be gathered from the fact that from April 1st to May 27th the following refuse was removed from the harbour and destroyed: 288 dogs, 152 cats, 814 rats, 64 bags of meat, 51 bags of fish, 252 fowls, 2 sheep, 4 pigs, 2 bags of chaff, 3 calves, 32 rabbits, and 2 wallabies. The City Council is still taking precautions to prevent the plague spreading. Mr. Nesbitt, the Town Clerk, states that the public are not co-operating with the Council in the matter, and he spoke strongly of the indifference shown by the public, and thought that if another outbreak occurred the citizens would be mainly responsible for it. A further case of plague was discovered after the death of the patient in the Coast Hospital. The source of infection has not been traced.—*The Australasian Medical Gazette*, June 20th, 1904.

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THE

Journal of Tropical Medicine

OCTOBER 1, 1904.

JAPANESE ADVANCES IN MEDICAL SCIENCE.

ALTHOUGH war by sea and land holds the chief place in both historical and popular interest in Japan at the present time, it is by no means usurping the energies of the Japanese. In many branches of scientific enquiry excellent work is being done, and in none more so than in the domain of medicine. Professor Kitasato has recently published some investigations on serum therapeutics conducted in his laboratory by his pupils and himself. An account of Kitasato's work was given at the recent annual meeting of the American Medical Association, by Dr. Miajama, of Tokio.

Kitasato is best known by his work on tetanus and the bacillus of plague, but in several departments of serum therapeutics the Japanese savants have been busily engaged. In Japan there are several institutions devoted to laboratory work: the Serum Institute, the Infectious Disease Institute, the Vaccine (or Lymph) Institute, and the Plague Laboratory. In the last-mentioned a plague prophylactic vaccine is prepared, and in Osaka and Formosa, where plague has most prevailed, some 200,000 people have been treated prophylactically, with the result that few cases of plague have been recorded lately.

A cholera vaccine was also prepared when cholera appeared in 1895, and it is stated that after treatment by the vaccine the death-rate was reduced from 70 to 33 per cent.

Prophylactic inoculations against hydrophobia were improved upon by Oshida, with the result that of 428 persons treated during the last seven years, two only died from hydrophobia.

In 1897 Shiga discovered a bacillus of dysentery, and immediately set to work to prepare an anti-dysenteric serum, which proved successful, inasmuch as the death-rate lessened from about 30 or 40 per cent. to 2½ per cent. only. A prophylactic vaccine against dysentery proved eminently successful in 1900, when dysentery broke out in the village of Kanagwa. A number of persons contracted a virulent form of dysentery in Kanagwa, and the medical authorities with commendable promptitude inoculated all persons in the village over four years of age, with the result that the disease immediately ceased.

In addition to the above-named preparations, a typhoid serum and vaccine have been prepared and used, and the value of an anti-tuberculous serum is being tested at the present moment.

In many other ways the Japanese have added to our common stock of medical and scientific knowledge. It is encouraging to know that the efforts of the white man are being aided by people of other races; and it is to be hoped as civilisation and modern education reach other peoples, unexploited intellects will be called into existence to help mankind in the struggle against disease. The Japanese have been the pioneers in Asia, but we hope soon to welcome the brilliant intellects amongst the Chinese and other races in the field of scientific enquiry.

Reprint.

PROPHYLAXIS OF MALARIA.

By Major G. H. Fink, I.M.S. (retired).

During the discussion on the prophylaxis of malaria at the meeting of the Section of Tropical Diseases at the British Medical Association on July 28th, 1904, Major G. H. Fink made the following remarks:—

There are many points in Dr. Stephens' paper which place us in a very difficult position as to the prime origin of malaria while considering Ross's investigations with regard to the particular species of *Anopheles* in which he (Ross) had found the malarial parasite. The speaker previous had referred to the food of mosquitos, and I feel that the difference in the opinion as to the particular *Anopheles* in which the parasite of malaria is to be seen may possibly be due to the food, as well as the soil, as conditions favouring the life of the parasite or otherwise. An *Anopheles* mosquito, which is harmful as regards malarial transmission in a clayey, moist soil and atmosphere, might be harmless in a sandy, dry soil and atmosphere. With regard to this particular point of finding certain conditions in cells, I would like to state that Professor Heitzman of Vienna had in his investigations found a nucleus always present in "unicellular organisms" which he had cultivated in Vienna, but the same organism presented no nucleus in New York. This would, perhaps, throw some light upon the subject. Plehn's "primitive bodies," or karyochromatophile granules, mentioned in Manson's book, have yet to be thoroughly investigated, since it is acknowledged that very little was known about them, except that they are to be seen in the blood of Europeans on the West Coast of Africa soon after their arrival there, but attended with anæmia, and this before malaria has pronounced itself in the individual. It might be considered as a "latent phase" of malarial fever parasites, but an organism on the borderland between the vegetable and the animal, which presented both the male and the female element, which had to pass through the usual cycle before its exact position could be recognised in the body of the mosquito, and before malarial fever was transmitted through the bite of that insect to man.

With regard to prophylaxis of malaria many substances were mentioned in books; but peppermint oil was not given as a culicide or culicifuge. I had tried it in Sibsagur district, Assam, in my own house with good effect, and found it superior to petroleum. I also had tried it as an emulsion with castor-oil and liquor potassæ, which I sprinkled over the stagnant water of a quadrangular moat around the station. The mosquitos, on the side of the moat where it had been tried, were lessened in numbers, and the fever cases on that side diminished greatly. I felt that such an experience was worth recording, and have only come forward with my remarks since I believed that we could not learn too much about malaria and its prevention in every country from the lips of all interested in the subject.—*British Medical Journal*, 1904, September 17th, page 641, Discussion: paragraph VIII.

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By Fritz Schaudinn (Rovigno).

(*Translated from the German by P. Falcke.*)

(*Continued from p.* 266.)

(*i*) The Migration of the Trypanosomes through the Body of Culex Pipiens.

Before commencing the description of the migration undertaken by these parasites through the body of the mosquito, I must preface a few remarks which indicate that all individuals of the species *Culex pipiens* are not adapted for developing the trypanosomes in their bodies. I have usually found that only about 10 per cent. of the mosquitoes used for the experiments allowed the parasites to develop undisturbed. The manifold grounds for this occurrence are minutely dealt with in the complete work. In some cases it is found that the mosquitoes used for the experiment are already suffering from some other parasitical disease which baulks the parasite already present, preventing the development of a fresh one. Some mosquitoes, from causes that I have not yet solved, are unable to digest the blood of the bird, and it is evacuated in an undigested condition. Others, again, do not bite the bird. Moreover, I am convinced that in the mosquitoes, as also in single individuals, or entire broods or races, there is an acquired or natural (?) immunity against these parasites. There is another category of cases in which the experiment of transmission miscarries, that is, when the development of the parasite is too powerful, the mosquito then may die of the infection. In short, a particular stage is necessary to carry one over the possibilities for the failure of the transmission. I will here only shortly describe the undisturbed course of the infection, and pause to indicate when I have observed obstacles in the propagation.

The primary necessity for the success of the infection of the mosquito is naturally the presence of the suitable., *i.e.*, the mature stages in the blood. Shortly, before allowing the mosquito to bite, the blood of the bird must be examined to ascertain if mature females, as well as microgametocytes, are present; and, indeed, it is not sufficient to look in the damp chamber to ascertain if microgametes are being formed, as I first did. It is only the assurance of the presence of motile ookinets in the damp chamber that confirms the probability that the development of the parasite will commence in a normal manner in the intestine of the mosquito. The dawn between 4 and 6 a.m. affords the most favourable time for the infection. During the act of sucking the parasites are introduced with the blood through the proboscis, œsophagus, sucking stomach, and into the midgut. Here the development begins with the fertilisation and formation of ookinets. The transformation of the ookinets into the various sorts of flagellata can be accelerated or retarded by warmth or cold. Whereas, at a temperature of 26° C. the first trypanosomes were found

after from eighteen to twenty-four hours, at 8° C. they were only found on the fifth day.

When to Kill the Mosquito.

As formerly mentioned, the colour of the fæces is a fairly reliable test as to when the mosquitoes should be killed. When the colour changes from black to grey it is the most certain criterion that the flagellata will be found motile in the intestine. The period of swarming and propagation of the trypanosoma usually attains its termination shortly before the last remains of the digested blood are voided from the midgut in the form of the well-known blackish-brown granules. All stages in the resting condition are then found in the empty intestine on or between the epithelial cells of the midgut; and after this first period of propagation the posterior section of the stomach to the valve in front of the Malpighian tubes is preferred for attachment, and only in very rare cases, and in very strong infection, have I found great agglomerations of the trypanosomes in the "neck-part" of the midgut after the first meal. Should the blood contain too many parasites the development may be already stopped after the digestion of the first meal. I have found that in such cases the epithelium of the intestine is so closely beset and permeated with parasites that they have caused the mosquito to perish. At the second feeding such a mosquito was unable to digest the blood; it was voided unchanged and the mosquito died after two days. The necropsy showed the condition described. If the mosquito is made to fast after the first feeding, only female forms remain on the wall of the intestine, as already mentioned. If one therefore desires the parasites to continue to develop quickly the mosquito must again be fed before the last remains of the digested food has been discharged. The resting period of the trypanosomes only ceases when the second meal in the stomach has become capable of absorption, that is to say, when the blood corpuscles in the peripheral parts of the blood-cake have become disintegrated.

Second Period of Movement.

Now the second period of movement and multiplication commences: the parasites distribute themselves in the midgut and with their growing numbers gradually spread towards the front and penetrate into the neck-part. At the end of the second digestion they again attach themselves to the intestinal epithelium; they remain motile, the longest in the invaginated crypts in the section which is called fore-stomach. This is easily explained by the circumstance that at this part of the midgut the only part that does not possess an absorbing epithelium is to be found. The dissolved nourishment remains there longest. The parasites in growing numbers are attracted thither, those which arrive first fastening themselves on. This they could not do if, as mentioned above, the regeneration of the epithelium could set in at this place and at this time. The epithelial cells at the second introduction of food have cast off their gelatinous cuticle and are now in the act of forming it anew. The trypanosomes are, therefore, able to pierce the soft surface of the epithelium with their flagellate apparatus and to attach themselves. More and more individuals swarm thither from the intestine as the food becomes scarcer, and force themselves into the camp of the trypanosomes which are already closely packed there. When the entire residue of the food

Fig. 10.—Median section through the neck-part of the midgut, with agglomerations of trypanosomes.

of the second digestion has been voided from the intestine an enormous number of parasites have collected in the invaginated epithelium of the fore-stomach. This lump, as it were, is composed of many rows of thousands of trypanosomes. Fig. 10 at a low power represents a section through this tumour-like agglomeration of trypanosomes in the neck-part of the midgut.

Fig. 11.—Median longitudinal section through Basili's curvature of the ileum of the mosquito, with firmly located balls of trypanosomes in it.

The gelatinous layer of the epithelium of the fore-gut to which the first trypanosomes are anchored becomes gradually hardened to a firm, chitinous cuticle, which is lifted off at the next regeneration of the epithelium. If now the mosquitoes are fed for the third time the invaginated villi of the fore-stomach loosen at the entry of the blood into it, the midgut being pushed out again in the manner described above, by the clusters of parasites which are held together by the chitinous layer at their base, just like the finger of a glove. The blood flowing in pushes the entire rolled-up ball in front of it through the entire midgut and further into the ileum. In consequence of the peristaltic contraction of this section of the intestine moving from the front backwards the

ball is forwarded to the commencing portion of the colon and is only brought to rest at Basili's curvature, the narrowest spot of the intestine. Fig. 11 shows a longitudinal section through this part, which makes the position clear.

Parasites Penetrate Intestine.

The character of the epithelium in the colon as described above shows clearly that the parasites, in consequence of the engorgement at this narrow part of the epithelium, can penetrate through the intestinal wall. They now reach the circulation, and through the heart are led partly towards the front and partly to the ovaries. If the collection of parasites at the epithelium of the fore-stomach was not large the whole ball could be evacuated. Then only those parasites remain in the midgut that had taken up their position in the epithelium of the midgut. These are mostly only females, and they are capable of again causing a relapse of the disease in the midgut. In short, once a mosquito has been infected it appears that the parasite can remain in the mosquito's body during its entire term of life.

Migration of Parasites.

We will first consider the further course of the migrations of the parasites. The parasites that have invaded the heart are led through the aorta direct into the space which surrounds the pump organ of the pharynx. They come to rest between the pump organ and the pharyngeal valve. Here in the foregut is the only place where the epithelium is about the same type as in the colon; where, moreover, there is the greatest rest and a stagnation in the circulation of the blood in consequence of the narrowing of the neck. Gradually the trypanosomes gather together and by increasing constantly become large lumps of agglomeration. Again a swelling-like collection arises round about this part of the pharynx. As the chitinous wall of the neck opposes a limit to the further growth of the ball, the pharynx finally is entirely pressed together by the heaps of parasites. Its tunica elastica muscularis, which at this part is very delicate, becomes injured at single spots, thus rendering it possible for the flagellata to migrate into the pharynx. At the end of the third period of digestion of the mosquito one already finds the lumen of the pharynx filled with large balls of parasites. At the next feeding and with the evacuation of the sucking reservoir, which takes place in the manner described above, the rosettes of agglomerated parasite engorging the pharynx are passed out into the blood of the other host. The evacuation of the parasite, even in the most favourable case, can only take place at the fourth sucking of blood by the mosquito; accordingly in the most favourable conditions of temperature (26° to 28° C.) the total period occupied for the migration of the parasites from their entry in the body of the host is seven or eight days, as a satiated mosquito at this temperature requires about two and a half days to digest the food.

The second way which the parasites can take after breaking through the wall of the colon leads into the ovaries. As the ova are mostly already mature at the commencement of the third digestion, and indeed are usually deposited after the third digestion, the parasites cannot infect this brood, as I shall prove in my complete work. They are only able to penetrate into the youngest eggs of the follicle and thus only infect the next brood. After copious feeding of the mosquitoes it happens not rarely that the flagella multiply in the vitellus of the growing eggs; I have even observed cases in which the entire ovarium was so closely packed with flagella that they caused a parasitical sterility of the mosquito; often, however, when the infection was but scanty only a few parasites penetrate and under certain circumstances go to rest in the vitellus as females. They remain in the gregarine condition within the vitellus during the entire development of the embryo, and are then found in the same condition not only in the intestinal epithelium between the epithelial cells and the tunica elastica muscularis, but also in the abdominal cavity of the young mosquitoes. I have not yet followed them through the entire period of larva and nympha. As soon as the newly-hatched infected mosquito sucks blood, the female resting stages of the parasites attain pathogenesis and again flood the body of their host with the flagellate stages. This explains the reason why the young mosquito cannot infect the bird with the first bite, but only, as my investigations have proved, at the third feeding. The experimental infection of the daughter generation is carried out most easily by keeping the mother mosquito warm during the first two periods of feeding and by putting her on ice at the third feeding. The reasons for this procedure will be understood from the preceding explanation.

The same process is gone through in Nature when autumn merges into winter. The parasites therefore may thus remain alive in the ovaries of hybernating mosquitoes, and the first generation of mosquitoes hatched in spring may be already infected. My experiments are not yet concluded, so that I cannot say if the hybernating old mosquitoes are able to cause infection by their bite, or the parasites only remain alive in the ovaries. I will come back to this question in my complete work, where we shall see how nearly connected this is with the malaria problem. I may here mention preliminarily that in the development of the tertian parasites, *Plasmodium vivax*, I have, contrary to my previous opinion, come to the conviction that the heritage in the Anopheles may take place in a corresponding manner and under similar conditions. We shall, however, see that our present epidemiological opinions are but little altered thereby. In my further malarial studies I hope to come back to this problem.

In the malaria parasites, as well as in the halteridium infection, it appears to me, however, that the percentage of mosquitoes in which the parasites are inherited is remarkably small. In nature this way of spreading the parasites probably only plays a part in mosquitoes that have survived the winter, and occurs less rarely than their distribution by means of the relapses at long intervals after the survival through the winter of the warm-blooded host. In those forms that have missed the alternation of hosts in the course of their life-history, as is the case with the flagella of the house-fly, as Prowazek will demonstrate, inheritance

plays a more frequent part in the spread of parasites than direct transmission. I shall prove the same in regard to the blood parasites of the lizard (*Karyolysus*), which have an alternative host in an acarus. Here likewise direct transmission and transmission by inheritance is equally developed. Finally, in Texas fever the second way, *i.e.*, through inheritance, appears to cause infection (?).

In the Halteridium trypanosoma, as we have learned, the same forms of flagella are present at every period of propagation. We can, therefore, experimentally induce the infection of halteridium of the owl with all the stages of the mosquito infection. I have infected the owls with halteridium with the flagella of the first period of propagation in the mosquito, as well as with that of the ovaries, by injecting an infusion of the parasites in a salt solution with a Pravaz syringe. Naturally also the transmission of the parasites from one owl to the other can be successfully accomplished by means of the inoculation of the blood containing the parasites, as has long been known. My researches as to the period of incubation in the owl are not yet concluded; it need only be mentioned that the parasites in young owls appear quicker in the peripheral blood on the second day after the infection. I have already found the indifferent trypanosomes in peripheral blood. Moreover, immunity seems to be conferred on the bird once it has overcome the disease. My experiments, however, do not suffice to decide this question entirely.

(*To be continued.*)

Drugs and Remedies.

"Validol": a Remedy for Sea Sickness. By Dr. K. Koepke. *Therapeutische Monatsschefte*, June, 1904.—Patients who in the initial stage complain of nervous headache, nauseous taste, excessive flow of saliva, giddiness, &c., are given 10 to 15 drops of validol on a piece of sugar and told to lie down for half an hour. Later on they may imbibe a glassful of wine and eat a biscuit. This is generally sufficient treatment. After an hour the patient feels fresh and ready for a meal. If necessary, the treatment is repeated. The proceedings are less simple with persons who have lost much bodily and psychical strength through several days' suffering. Although these patients frequently object they are ordered to bed at once; they are then given validol on a piece of sugar and told to slowly eat the sugar up. The sight of the sugar will often be repulsive to a patient, but when the doctor's persuasion has made him take it, and the pleasantly cool and invigorating effect of validol is felt, he will soon himself demand a repetition of the dose. I have on several occasions tried to give validol with other vehicles, but I have always returned to sugar. If a first piece be vomited the patient is at once given a second, which is almost without exception retained. The patient will very soon have a pleasant warming sensation, the stomach pressure and headache diminishing. After half an hour he is given the yolks of two eggs mixed with sherry and ice in teaspoonfuls. This mixture will be retained in nearly all instances. The same process is repeated several times daily, and when once the patient has again had a good night he may be allowed a different light diet. It would be entirely wrong to accede to the frequent requests of patients to let them eat what they feel an appetite for—instantaneous vomiting mostly follows where the error of giving way is committed. I have had a number of patients who had to subsist on the yolk and sherry mixture for days and weeks; the slightest attempt to alter the diet resulted in immediate vomiting. In some cases the aversion against sherry and yolk is strong enough to prevent its administration. I then resort to cold oatmeal porridge in soup form, after previous administration of validol.

What is the explanation of this splendid effect exercised on sea sickness by validol? My observations lead me to the conclusion that in the majority of cases it is cerebral anæmia which produces the symptoms. The longer the duration of the chief symptom, *i.e.*, vomiting, the more the stomach must naturally be affected. We have therefore two indications to combat, cerebral anæmia and gastric disorder. Validol possesses the necessary properties for counteracting both in an excellent manner.

Notes and News.

Because a woman suffering from cystitis was cured by doses of 3 grs. sulphate of quinine and 1 gr. salol, given every three hours, a contributor to the *New Orleans Medical and Surgical Journal* of July, 1904, comes to the conclusion that the disease was malarial in origin. Besides being a specific in malaria, however, quinine has other valuable properties, and it is not necessary to assume that when the drug shows beneficial results the disease it is being administered for is malarial.

Surgeon P. A. Lovering, of the United States Navy, has been appointed to the Chair of Tropical Diseases at the Naval Medical School, Washington.

Beri-beri in the United States.—It is reported that in the United States Army, during 1903, there occurred more cases of beri-beri than of typhoid.

Colonial Appointments.

Dr. E. R. Branch, of the Medical Department of St. Kitt's-Nevis, has arrived in England on leave of absence.

Dr. J. H. Ebell has been appointed Acting Assistant Principal Civil Medical Officer, Ceylon.

Dr. C. T. Griffin has been appointed acting Principal Civil Medical Officer of Ceylon.

Dr. H. A. Keegal has been appointed Acting Colonial Surgeon at Galle, Ceylon.

Dr. L. D. Parsons, Resident Surgeon Superintendent of the New Providence Asylum, Bahamas, has arrived in England on leave of absence.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Assam.

Medical Dispensaries in Assam.—Natives in Assam are appreciating the benefits of Western medicine to a rapidly increasing extent. Whereas in 1899 patients numbered 688,803, in 1902 not fewer than 821,331 were treated in the 102 dispensaries thrown open to the public.

Kala-azar is a frequent cause of illness amongst coolies. Small-pox cases numbered 2,571. At the Hailakandi Dispensary many cases (300) of small-pox were treated, the prevalence of the disease being attributed to the fact that inoculation in this district is not practised.

In spite of special provisions as to privacy, the attendance of female patients is unsatisfactory, and no scheme as yet tried has succeeded in inducing women when ill to come to the dispensaries.

Cancer in Brazil.

SODRÉ, A. DE A. Frequency of Cancer in Brazil. *Brazil Medico*, vol. xviii., No. 23.—Cancer in Brazil, according to Professor Sodré, is rare. In the equatorial region of Brazil cancer is quite exceptional; the number of cases, however, increases as the Tropic of Capricorn (23° south latitude), is approached. At 30° south the disease attains its maximum proportions. Uterine cancer is the commonest form met with. Cancer of the organs of the alimentary canal are rare. Sodré gives comparative statistics of cancer returns from several countries: France, 9·8 per 10,000 inhabitants; Great Britain, 7·6; United States, 3·4; Tasmania, 5; New Zealand, 4·4; Brazil, 0·41.

Cholera.

PERRY, J. C. Cholera in the Philippines. Report of Surgeon-General of Public Health and Marine Hospital Service, 1903.—During 1902 the number of cholera cases in the Philippine Islands amounted to 179,689, and the deaths from the disease to 114,274. Surgeon Perry considers (*a*) infected food; (*b*) contacts infecting their own food, and possibly that of others, and (*c*) infected water taken from shallow wells and from the Pasig River and the estuaries, are the principal factors in the incidence of cholera in the Philippines. Flies are considered to be the chief agency in the spread of the disease. The Chinese did not suffer severely, owing to the fact that they drink their water boiled (tea) and eat cooked food.

Hong Kong.—July 16th to 23rd, 2 cases, 2 deaths.

Bombay.—July 25th to August 2nd, 23 deaths.

Calcutta.—July 16th to 30th, 15 deaths.

Persia: Teheran.—July 16th to 23rd, 600 deaths daily.

Turkey: Bagdad and vicinity.—July 7th, 320 deaths.

At *Multra and Oman* plague also reported.

Plague.

PREVALENCE OF THE DISEASE.

India.—During the weeks ending August 27th and September 3rd, respectively, the deaths from plague amounted to 8,304 and 9,914.

South Africa: Port Elizabeth.—During weeks ending August 27th and September 3rd, fresh cases 3 and 0; deaths 1 and 0.

Hong Kong.—During weeks ending September 10th and 17th, fresh cases 3 and 4; deaths 3 and 4. Clean bills of health issued September 23rd.

Mauritius.—During the weeks ending September 15th and 22nd, fresh cases 6 and 7; deaths 5 and 5.

Port Said.—Case of plague reported, September 20th.

Honolulu.—August 22nd, 1 death, and August 23rd, 1 death.

Brazil: Balria.—June 16th to August 5th, 30 cases, 11 deaths. *Rio de Janeiro.*—July 7th to 24th, 1 case, 1 death.

China: Amoy.—January 25th to June 16th, 45 deaths.

Egypt.—July 23rd to 30th, 17 cases, 8 deaths.

Japan: Formosa.—July 16th to 30th, 55 deaths.

Peru: Lima.—July 5th to 16th, 7 cases, 2 deaths.

Plague in China.

Summary of replies to questions sent out to all parts of China and Formosa by Professor W. J. Simpson whilst investigating plague in Hong Kong in 1903.

The questions dealt mostly with the date of appearance, the plague in rats and other animals, and the evidence of mild cases of plague.

Yunnan.—Emile Roche, in 1871-73, found plague epidemic in Yunnan, said to have come from Burmah. Rats were first attacked and subsequently all domestic animals.

Western Yunnan.—Mr. Grosvenor reports that plague prevails in some of the parts of Yunnan he traversed in 1882. He remarks that primarily amongst animals rats suffer, then poultry, and afterwards pigs, goats, ponies and oxen successively die off.

Pakhoi.—Plague observed by Dr. J. H. Lowry in 1882. It is reported that for fifteen years previously plague cases had been found in Pakhoi. Epidemics have at times occurred amongst pigs, buffaloes, fowls, and dogs, and recently pigs and dogs had buboes with fever.

Changpoo (Fokein Province).—Dr. D. Preston Maxwell reports that the first known cases of plague in Changpoo occurred in May, 1900, but no real epidemic occurred until April, 1901. The rat deaths seemed to precede plague in human beings.

Canton.—The Rev. J. McClay says plague appeared in February, 1894. No animals besides rats known to be infected. Other animals became ill, but not with plague. Some observers report that cats and poultry were infected.

Fatshan (near Canton).—Plague appeared in 1894. Drs. A. and W. Anderson found an epidemic disease amongst cattle and water buffaloes during 1893, 1894, and 1895.

In Canton Province.—Rev. C. R. Hager states that rats were infected first, that pigs and cattle are often

attacked by illness, but its nature is not known. "Climatic bubo" is common in one village he is acquainted with every autumn.

Swatow.—Dr. H. Layng states that plague appeared in 1895, not epidemic until 1898. Dr. A. Lyall refers to outbreaks of glandular fever every year for some twenty years, not in any way connected with plague. Epidemics in cattle and pigs seem independent of plague.

Chao-chow-Foo (*viâ* Swatow).—Dr. A. Cousland states plague appeared 1898, and that no other animals were affected besides rats.

Amoy.—Plague appeared 1895. At *Changpoo* (Amoy) Dr. T. M. Howie reports the disease appeared in 1901. During epidemic cattle have plague; pigs had fever and buboes and died.

Chiang-Chin (Amoy).—Dr. A. Fahmy says plague appeared 1896. A good many cases of pestis minor. A cattle plague occurred concurrently with an epidemic of plague.

Chin-Chew (Fokien).—Dr. B. L. Paton states plague appeared 1894. Plague first appeared as pneumonic plague. No animals besides rats affected.

Ngu Cheng, Hok Chiang.—Miss L. M. Masters saw plague first 1900; a cat died of fever and buboes after tasting plague-infected rat. Other animals no epidemic.

Foochow.—Dr. Ellen M. Lyon says plague appeared 1897. No epidemic in animals. Few mild cases in men.

Pagoda Anchorage, Foochow.—Dr. H. T. Whitney reports plague in 1895 or 1896. No mild cases. No epidemic known amongst animals besides rats.

Nodoa (Haman).—Dr. E. D. Vanderbury. Plague appeared 1900. Mild cases seen. No epidemic amongst animals other than rats.

Lien Chow (North-west Kwantung).—Dr. E. C. Maehle. No plague in men or animals.

Yeung Kong (Kwantung).—Dr. W. H. Dodson says plague in the town; rats, but no other animals, have plague.

Tainan (Formosa).—Dr. T. L. Maxwell says plague appeared 1896. Rats have plague. Swine and buffaloes have had epidemic diseases of late years. Japanese state buffalo disease to be rinderpest. Nonveneral buboes have occurred in a few people.

Daitotéi (North Formosa)—Dr. A. W. Wilkinson says Japanese state plague endemic here. Mild cases common, and they vary with severity of plague. Besides rats, cats have been found with plague in a few cases. Pig cholera epidemic noted.

Eng Chluen (Fokien).—Miss F. P. Crowther says plague appeared 1899. Besides rats, the bats died by hundreds before the outbreak of a bad epidemic of plague. Pigs, fowls and buffaloes died in numbers during plague season of 1902. House lizards died during one epidemic. Mild cases of plague were frequently noted in all outbreaks, especially the first.

Sio Kee (Fokien).—Dr. C. O. Shumty says plague occurred in districts around the city. At first many mild cases of plague. No animals attacked besides rats.

Hok Chiang.—Miss M. Poulter says plague first known in 1901. Mild cases occur. Besides rats, pigs, goats, rabbits and chickens have died in considerable numbers before and during an outbreak of plague.

Liao Yang.—Dr. D. D. Muir says plague appeared 1899, in December. Imported from Newchang. No recurrence in man or animals.

Manila (Philippines). Dr. L. M. Mans says plague appeared January, 1900. A few cases of pestis minor. All rodents suffer from plague. Rinderpest occurred amongst cattle. No plague reported from Peking, Szechuan, or Hankow.

Yellow Fever.

Brazil: Rio de Janeiro.—July 17th to 24th, 3 cases, 1 death.

Ecuador.—July 13th to 20th, 2 deaths.

Mexico.—August 14th to 23th, 3 cases.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

A Factor in the Anæmia of Ankylostomiasis.

Loeb and Smith (*Proceedings of the Pathological Society of Philadelphia*, June, 1904) state that the excessive anæmia met with in patients infected with ankylostomes, even when the intestinal parasites are few in number, may be due to (1) a substance secreted at the anterior extremity of the ankylostome having the power of preventing coagulation of the blood, and thereby allowing a prolonged hæmorrhage after puncture, and (2) one worm often makes a series of punctures, so that a quantity of blood may be lost from the bite of a small number of ankylostomes.

Ascaris Texana.

Smith, A. J., and Goeth, R. A. A note on the hitherto undescribed Ascaris Parasite in the Human Intestine. *Journal American Medical Association*, 1904, August 20.—Two female specimens of an ascaris stated to be different from any known ascaris occurring in human beings, were recovered from the stools of a white man by Drs. Goeth and Smith. The patient has passed similar worms for many years at long intervals. No male specimen has been found. The parasite most closely resembles one of the ascarides met with in certain birds and reptiles.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Publishers.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

HAVE ANKYLOSTOMIASIS PATIENTS ANY PECULIAR MARKING ON THEIR TONGUES?

By T. M. Russell Leonard.
House Surgeon, Colony Hospital, Grenada, West Indies.

In this Journal, under date August 15th, 1904, a communication is contributed under the above heading, in which it appears that in Egypt at least this peculiar pigmentation has no reference to the stage of anæmia in ankylostomiasis. In the Journal of September 1st, 1902, Dr. Duprey, of St. Lucia, pointed out that this pigmentation is unknown among the West Indians, and only seen in the immigrant coolies, and was probably due to their habit of chewing the leaves of the "phan" plant. This view I certainly disagree with; I have been familiar for years in India with this habit, and did not notice any definite pigmentation except a red staining of the tongue, which disappeared on cessation of the habit. Another point is that, except in the case of Trinidad or Jamaica, the coolies have no opportunity of indulging in the habit, as the "phan" plant does not grow out in these islands, and yet the pigmentation is seen on their tongues as well as in children who have not contracted the habit. While in St. Vincent, West Indies, this peculiar marking of the tongue was pointed out to me by Dr. C. Branch, of the Colony Hospital, and he mentioned that it was seen in cases of ankylostomiasis. On my appointment to the Colony Hospital, Grenada, I determined to investigate this point, and the following results tend to show that at least in these islands this pigmentation of the tongue has something to do with the disease if not diagnostic of it. I carefully examined every case that was admitted into hospital from April 1st, 1904, to September 21st, 1904, and found that 112 out of the total cases, viz., 362, showed the ova in their fæces. Of this number 89 —coolies and West Indian Negroes—presented this pigmentation on their tongues; in some cases merely a few minute scattered points; in others, larger areas on the tip and sides of the tongue.

The remaining twenty-three cases were white Barbadians, and these showed no pigmentation. The remainder of the total number of cases were free of any pigmentation either of tongue or sclerotic, except in a few cases, viz., twenty-nine, who showed colonies of pigment in the sclerotic of their eyes. The pigmentation varies in colour from a faint blue to a blue-black, and is seen in minute points or in areas on the tip or sides of the tongue, and is found only in the West Indian Negro and in the immigrant coolies and their children, and not in the cases of Europeans or Barbadians or pure whites.

The form of dermatitis affecting the feet of the labourers here, known as ground itch, &c., and shown by Bentley to be due to the penetration of the skin by the embryo ankylostoma, leaves in a large number of cases a peculiar mottling of the skin, and the points or areas of pigmentation seen on the tongue may be due to the injection taking place there, the embryo parasite being conveyed to the mouth on the hands or in the food of the patients, who belong entirely to the labouring class and are not noted for their cleanly habits.

Cases exhibiting this pigmentation of the tongue did not, in many cases, show marked anæmic symptoms, and in my opinion it does not bear any reference to the degree of anæmia, but solely to the fact that ankylostoma are present; for on the removal of the parasites, and subsequent treatment with iron and arsenic and a generous diet, this pigmentation becomes fainter, and in many cases finally disappears.

The cases examined and treated by me were of all ages, children to old men and women, and the above results tend to show that in the West Indies this pigmentation has a distinct bearing on the disease and has a great diagnostic value.

ON THE OCCURRENCE OF AINHUM IN SOUTH AFRICA.

By John Muir, M.D.Edin.
Vailima, Ficksburg, Orange River Colony.

In the Journal of Tropical Medicine of March 2nd, 1903, appeared some notes of mine of a case of ainhum which I had seen in 1899, in a Leaooa native from the Northern Transvaal. According to the Editor of the late *South African Medical Journal*, no case had been reported from South Africa to his knowledge, and as Sir Patrick Manson considered these notes worthy of record, perhaps a few further remarks may not be without interest.

Since then I have met with two cases in the Orange River Colony, while on a holiday there. They occurred in the Ficksburg district. One of these, a woman, has always resided in the late Orange Free State and Orange River Colony. I was much interested, however, to hear from Dr. N. M. Macfarlane, of Thlotsi, Leribe, Northern Basutoland, that he has seen a large number of cases during the last nine years; and that it is well known among the Basutos, and to medical men practising among them. It is confined to the natives, and is common, I understand, in the northern portion of that country. I was shown six toes in spirit, which are to be sent to Dr. Bulloch, of London, for pathological examination.

In my edition of Manson's book, South Africa was not mentioned in the geographical distribution of the disease. It is apparent, however, that ainhum exists in the Transvaal, Orange River Colony and Basutoland, among members of three distinct tribes. Careful inquiry will probably show that it is pretty generally distributed throughout the sub-continent.

THE TREATMENT OF YAWS BY ALKALIES.

By J. Numa Rat.
St. Kitt's, British West Indies.

Dr. Eugene Ellis Modder, Assistant Colonial Surgeon, Rutnapura, Ceylon, in a paper entitled "Bacteriology of Parangi (Yaws)," which appeared in the Journal of Tropical Medicine, July 15th, 1904, discusses the success which, he states, has attended his treatment of parangi by bicarbonate of soda.

He was led to adopt this treatment by observing that a certain micrococcus derived from the secretions of the parangi tubercles could be grown in acid, but not in alkaline media. He gave the drug in doses of 20 grs. three times a day, and applied it as a lotion of the strength of 10 grs. in an ounce of water. He claims that by these means the granulomata can be made to disappear in from six to fourteen weeks.

Besides drawing attention to this treatment, I wish to bring to the notice of those interested in the disease the observations made by me on this subject, and reported in my monograph on yaws (1891), observations which I had myself forgotten.

In describing the treatment to be followed in dealing with the secondary symptons of the disease, after recommending the administration of carbonate of ammonium, during the vesicular and papular stages, to promote the action of the skin, I wrote as follows: "When the tubercles have appeared, the same treatment must be continued until they have fully developed. . . . It (the carbonate of ammonium) has stimulant, antiseptic and diaphoretic properties, and it is readily diffused. Its alkalinity, however, is the virtue which causes it to be particularly useful in yaws. It has been already pointed out that the secretion from the yaws tubercles, until they begin to wither, is highly acid. This suggested to me the employment of a counteracting alkali, and carbonate of ammonium was selected on account of its stimulant, diaphoretic and antiseptic properties, by virtue of which I found it to act beneficially as well as by its neutralising the acid secretion of the tubercles, and thereby preventing their extension, coalescence and ulceration.

"After the tubercles have developed fully, the secretion from them must be kept neutral by continuing the administration of the carbonate of ammonium, which may then be given less frequently and in larger doses for that purpose. Five grs. may be taken three or, if necessary, four times a day in combination with from five to ten minims of liquid extract of cinchona. . . . The carbonate of ammonium and the cinchona are best given an hour before meals, and during its administration no acid of any kind should be allowed either as a drink or with the food; vinegar and acid fruits, &c., being specially forbidden.

"The anæmia which accompanies the disease in all its stages is to be remedied by a non-acid preparation of iron, the neutral ferrum tartaratum being well suited to the purpose, both for adults and children."

I should certainly be inclined to use a stronger lotion than one of 10 grs. of sod. bicarb. to the ounce of water as an application to the yaws granulomata. I have found liquor potassæ, or a solution of caustic potash in water, useful in destroying fungous granulations in yaws cases, and it is probable that an appropriate lotion can be prepared with these, if an alkaline application should be found beneficial.

The fact that only a few copies of my monograph on yaws have been published must be my excuse for quoting as I have done from my own writings on this subject.

I have received several enquiries as to where the work is to be purchased, and I could only reply that a few copies were printed for the Government by Messrs. Waterlow and Sons, some of which were given to Mr. Jonathan Hutchinson, senior, for distribution.

WELL-DEVELOPED MAMMÆ IN A NATIVE BOY IN RHODESIA.

By C. W. Breeks, M.B., D.P.H.

Medical Officer Northern Copper (B.S.A.) Company, Ninga Camp, Kafue, N. Rhodesia.

I enclose a photograph which may be of interest. The boy in the photograph with well-developed mammæ lives in a village a few miles from here, and is

well known among the white population in this district as "Mary Anne." He came to me a few weeks ago to ask me to remove them. I operated under chloroform and am glad to say both wounds healed by first intention.

I may mention that I have seen two other similar cases in this country, though hardly so well-developed as the above.

[Dr. Breeks sent also a photograph of the boy after operation, showing a complete recovery.—Ed. *J.T.M.*]

A CASE OF SYPHILIS SIMULATING LEPROSY.

By A. B. Duprey, M.R.C.S., L.R.C.P.
Government Medical Officer, St. Lucia, West Indies.

This is a case which presented some features of interest and illustrating, as it does, the carefulness one must adopt in the matter of prognosis. It is remarkable that in two instances the diagnosis seemed to have been mistaken—firstly, by the medical man who first attended to him; and secondly, by the fact that the man was refused passage on board an inter-Colonial boat, presumably by the medical officer, on account of the condition of his face. He had been attended on twenty-three occasions by a medical man, but not finding any relief, he had determined to go to Barbados in search of advice, when he was told that he could not be taken on board ship. He therefore came down to me, as next best to Barbados, I suppose, and explained his case with some detail, as he appeared exceedingly anxious with regard to his illness.

The question of prognosis was a serious one with him, and he at once challenged me to be straightforward in the matter. I had already perceived that leprosy was uppermost in his mind, and that he had probably been told so. It was also the first diagnosis that came to my mind as soon as I clapped eyes on him, and he was sharp enough to have guessed my thoughts. The error in diagnosis was therefore quite pardonable, inasmuch as there was little, if any, help obtainable by the history of his present illness.

He was a young man of mixed blood, usually designated a coloured man in the West Indies; his complexion was copper coloured, and his age 22. His gait was slow, cautious, and unsteady. His face was in a most interesting condition; it was swollen and fiery red, the redness being in large raised blotches, which were more or less circumscribed. The eruption had some appearance of symmetry, both sides of the face being equally affected. The nose was markedly prominent and swollen, its breadth being increased by the thick and dilated alæ nasi. The ears were remarkably swollen, thick and red; the lobules were indurated, and in fact showing to all appearances a remarkable likeness to leprous ears. The lips were thick and heavy. The red and thickened nose looked somewhat like an acute attack of acne rosacea, but when looked at through a lens, the inflammation did not seem to affect the sebaceous follicles, which seemed healthy enough and not plugged with sebum, as is usually the case in this affection; besides, there was the fact that the eruption had only been of fifteen days' standing.

He had had pains in his bones since last January, but the eruption on his face had only appeared within the last fortnight. There were a few patches of a scaly eruption on his chest and left arm, which he called eczema, and which did not seem to trouble him as much as the affection on his face. There was no sign of a healed chancre on the penis or any other marks anywhere. His throat was slightly congested, but he had not been troubled by sore-throat. Questioned as to whether he had had venereal disease, he admitted having had a slight attack of gonorrhœa in October last year; which speedily got well; but this fact seemed to him unimportant, as it always does to a good many people. I had my clue, however, and straightway put him under anti-syphilitic treatment, and advised that he should return to me at the end of six weeks, when I should then be in a position to tell him the nature of his illness. I took a photograph of his face, which though an imperfect one, yet shows a marked resemblance to a leprous face.

After six weeks he reported himself to be much better, and I could at once see by the change in his features that he had derived much benefit by the treatment. He walked better, too, and he informed me that the pains in his bones had been gradually growing less. I was then able to assure him that his disease was syphilis and not leprosy. I pushed on the treatment, with the result that after four months his face had completely cleared and all his pains had disappeared.

There seems to be no doubt that he was infected with syphilis in October last year, and that his slight attack of gonorrhœa was none else but a syphilitic chancre in his urethra. The after-history clearly proved that fact, and the treatment which was adopted clinched the question of diagnosis. I had intended to get a photograph of his face as it appeared after months of treatment, but he has since left the district. The accompanying photograph may be of some interest as illustrating in appearance a striking resemblance to a leprous face.

Prescription.

Urticaria.

Duhring recommends for external use in urticaria the following lotion, to be applied two or three times a day to relieve itching:—

℞	Acidi carbolici	ʒiss.
	Glycerini	ʒii.
	Spirit vini rect.	
	Aquæ amydalæ amaræ	āā ʒviii.

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1.—The address of the JOURNAL OF TROPICAL MEDICINE is Messrs. BALE, SONS & DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.

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THE

Journal of Tropical Medicine

OCTOBER 15, 1904.

THE LONDON SCHOOL OF TROPICAL MEDICINE.

ADDRESS BY SIR CHARLES BRUCE, G.C.M.G.

THE Inaugural Address for the Session, 1904-5, was delivered on October 7th, 1904, by Sir Charles Bruce, G.C.M.G., who has just retired from the post of Governor of Mauritius. He chose as his subject "Colonial Sanitary Administration and Tropical Diseases." Every one who reads the address must be impressed with the accurate knowledge and wide grasp of the subject possessed by Sir Charles, and the medical profession must rejoice to know that its labours, difficulties and triumphs are appreciated by one occupying so prominent a position in Colonial affairs. His statements, suggestions and recommendations concerning the problem of fighting disease in the Tropics are founded on sound premises, and his conclusions are based on the unfailing teachings of long experience. Sir Charles handles the subject from the standpoint of public health; the welfare of the European and native in the Tropics is the goal he aims at, and he advises continued investigation as the one remedial measure by which the greatest good is likely to accrue.

Sanitary laws must be founded, to be of real use, on a scientific basis, and Sir Charles looks to the schools of tropical medicine in this country as the intelligence department of the army of medicine in the Tropics. In his opinion these schools are fulfilling their duties as an intelligence department, and he urges continued and increasing support from the Government of this country, from the Colonial Governments, and from the public, so that the schools may accomplish the ends they have in view. The request to search for means of curing or alleviating prevalent diseases in tropical countries made by Sir Charles is very much to the point; and he reminds us that in spite of years of scientific research and costly experiments, the victims of plague are numbered by thousands a week. The efficacy of "native" remedies in certain instances was aptly illustrated by Sir Charles, and the fact that the flora of the world has not yet been exhausted in the search for remedial agents made evident.

A branch of study which is bound in the future to take a foremost place in dealing with tropical ailments is the close analogy between the several diseases which attack men and animals. The study is interesting from every point of view, but the financial aspect of the question was brought keenly home by Sir Charles. He said: "Up to the year 1902 my experience of tropical diseases was limited to the diseases that attack man. In 1902 an outbreak of the disease known as surra caused such a loss of animals as to destroy the system of transport of the Colony dependent on animal draught. I then learnt to recognise the necessity of extending the study of tropical diseases to those that attack animals. It became necessary, at an enormous cost, to substitute mechanical for animal transport by means of light railways, tramways, and traction engines, and the consequences of the disease not only imperilled the sugar industry upon which the

public fortune of Mauritius depends, it affected every department of public and private activity. I am able, therefore, to appreciate the reciprocal arrangements which have been made for the association of this School with the Royal Veterinary College."

Sir Charles congratulated the authorities of the London School of Tropical Medicine upon the success of the School, and upon the fact that the present session opened with a larger number of students in attendance than at any previous time since the School was founded.

TEXAS FEVER IN THE PHILIPPINE ISLANDS AND THE FAR EAST.

By James W. Jobling, M.D.,
Director of Serum Laboratory,
and
Paul G. Woolley, M.D.,
Assistant Director of Serum Laboratory.

Abstract from Report of Serum Laboratory, Manila, 1904.

Before Texas fever appeared in Manila an attempt was being made to import American stock in order to improve the grade of native animals. In order not to introduce Texas fever into the islands the cattle exported from the United States had been purchased at places 100 to 150 miles north of the Texas-fever line in California.

On November 18th, 1903, these cattle were landed in Manila. Prior to disembarkation they were examined and a few ticks were found, but these were examples of a species other than that found in the Texas fever belt of the United States. At this time the animals appeared to be in good condition and not suffering from any acute or chronic disease.

Immediately upon landing they were sent to the Serum Laboratory for observation and for receiving anti-rinderpest treatment. At the time when "simultaneous inoculation" would have been practised no virulent blood could be obtained and the cattle accordingly received prophylatic doses of immune serum only, so as to protect them until the necessary virulent material would be at hand.

Twelve days after the second prophylactic dose of serum, virulent blood was obtained and "simultaneous inoculation" was given to all but one animal. The animal from which the virulent blood was taken was received from Shanghai on November 28th. It developed rinderpest within a few days after arrival without having been inoculated, and was bled to death on December 3rd, 1903. The symptoms and *post-mortem* lesions were those always observed in rinderpest—that is, bloody diarrhœa, redness of visible mucous membranes, and discharges from the eyes and nose. No pathologic change was found which could be attributed to Texas fever. The connective tissues were not yellow, the spleen was small and firm, the gall-bladder enlarged and distended, and the mucous membrane of the fourth stomach inflamed and ulcerated. There were no symptoms which would lead us to think we had been using blood obtained from an animal suffering from Texas fever. This is the more certain since some of the blood was used not only to inoculate the American cattle but also eleven serum animals, the amounts varying from 1 to 1,000 cc., and thirty calves received 5 to 50 cc.

In all the cattle and calves other than the American cattle the reactions were those usually observed as following the inoculation of animals with virulent rinderpest blood. In no instance were there any symptoms which would lead us to think that we had been using blood from an animal suffering from Texas fever. This applies especially to some of the serum animals which received 1,000 cc.

The results of this treatment in the cases of the American cattle were disastrous, for in a short time, varying in individual cases from four to eight days, the temperature rose abruptly to between 41° and 42° C., and five of the animals died.

The first animal to succumb developed a high temperature about the usual period following inoculation by the "simultaneous method," and it was therefore believed that death was caused by rinderpest, but the *post mortem* showed none of the lesions of this disease; instead, there was a marked yellowish discoloration of all the connective tissues and cloudy swelling of the liver, spleen, kidneys and heart.

Two other animals died on the same day, but the disease was so unexpected that piroplasmosis was not suspected until an autopsy was made, when the yellow colour of the connective tissues and the size and consistence of the spleen, together with bloody urine, led to a diagnosis of Texas fever. The blood of these animals was not examined, but the following day another died, and in the blood corpuscles of the latter the causative organisms in stained preparations were demonstrated.

Upon these animals ticks were found which were collected and sent to the entomologist of the Bureau, who identified them as the Australian variety (*Boophilus Australis*, Fuller).

Besides these cases two others have occurred in Australian cattle which were said to come from a district where neither the ticks nor the disease itself had ever been seen. The cattle were temporarily immunised with serum, and some time after both died with symptoms of Texas fever and the organisms were found in stained specimens of the blood. Three other cases in Australian cattle, two of which were fatal, have been observed. All these animals showed the parasites, but in comparatively small numbers. The cases were subacute. Previous to the occurrence of these cases no similar ones had been observed, nor had the caretakers noticed any ticks until three or four weeks before the outbreak.

The above facts immediately brought up the question as to the origin of the disease, which had never before been observed in the Philippine Islands, but which had developed in animals imported from north of the Texas-fever line in the United States, and then only after these animals had been inoculated with fresh blood from native or Chinese cattle.

In order to answer this question it was necessary to discover whether the native or Chinese animals were immune to the disease and whether or not American cattle, presumably not immune, could be infected by injecting into them the blood from the healthy native or Chinese cattle.

In order to settle beyond doubt just what the conditions here were in regard to Texas fever, we attempted to reproduce the disease in Chinese animals by injecting subcutaneously blood containing large quantities of piroplasmas. For this experiment two animals were used, one a calf imported from Hong Kong, the other a cow imported from Shanghai. Both of these were negative. At the time of the inoculation the calf showed large numbers of ticks on its hide.

We next attempted to produce the disease by injecting blood taken from a healthy American animal, which had not been immunised by the "simultaneous method," and which showed no parasites, into a healthy Chinese one. The result was absolutely negative.

Following this we took blood from healthy animals used for serum purposes and injected it subcutaneously into American animals which had not received the "simultaneous method." This series of experiments was positive in two cases, negative in one. In the negative case we suspected an acquired immunity and later injected a large amount of parasite-containing blood, an experiment that was also negative and which apparently supported our supposition. Some weeks later one of the positive animals contracted rinderpest and died suddenly. This animal was also suffering from actinomycosis. At autopsy, in addition to the actinomycosis, lesions of both Texas fever and rinderpest were found, and the piroplasmas were found in the blood, but in a very small percentage of the blood cells. It seems reasonable to suspect that in this case the acquired rinderpest was the cause of the flaring up of the latent Texas fever and that the combination of the two diseases killed the animal.

The facts adduced as a result of the experiences detailed above were: First, that native or Chinese animals could not be infected with Texas fever by subcutaneous inoculation with relatively large quantities of blood containing the living parasites; second, that susceptible, non-immune American animals would acquire the disease following injections of blood taken from apparently healthy Chinese animals which had been immunised to rinderpest in the Philippine Islands; third, that we are dealing with true Texas fever and not the atypical South African or Rhodesian fever; and fourth, that a tick (*Boophilus Australis*), the intermediate host of the parasite of Australian pyroplasmosis, is present in these Islands.

Our conclusion, based upon these facts, is that Texas fever is endemic, not only in India, but also in China, Java, Borneo, Cochin China, Singapore, and the Philippine Islands, and that the majority at least of all native and Chinese animals are immune to the disease.

LONDON SCHOOL OF TROPICAL MEDICINE.

SIXTEENTH SESSION, OCTOBER—DECEMBER, 1904.

THE following students have entered for the three months' course:—

D. H. Ainslie, M.B., Ch.B.Aberd., D.P.H. Aberdeen.

D. Alexander, L.R.C.P. & S.Edin. (Colonial Service), North Nigeria.

D. A. Ashton, M.B., Ch.B.Victoria, (Colonial Service), South Nigeria.

C. A. Bentley, M.B., C.M.Edin. (Private).

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J. C. Carr, M.B., Ch.B., M.D.Edin. (Private).

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Miss K. A. Dawson, L.S.A.Lond., M.D.Brux., Society for the Propagation of the Gospel, India.

W. A. Densham, M.R.C.S., L.R.C.P., D.P.H.Camb. (Private).

B. M. Flood, L.R C.P. & S.Edin. (Colonial Service), North Nigeria.

Miss M. K. Gibson, M.B.Ireland., Society for the Propagation of the Gospel, India.

J. W. Gromitt, M.R.C.S., L.R.C.P., D.P.H.Lond. (Colonial Service), Mauritius.

H. F. Hodgkin, M.B., B.C.Camb., M.A., Friends' Foreign Missionary Association, China.

L. Austen Holcroft, M.B. Ch.B.Edin. (Private).

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A. C. Lorena, L.R.C.P. & S.Edin. (Colonial Service), West Africa.

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F. L. Norris, M.B., C.M.Glas., (Colonial Service), Antigua.

P. Phillips, M.R.C.S., L.R.C.P. (Colonial Service), Lagos.

C. H. D. Ralph, M.R.C.S., L.R.C.P. (Colonial Service), Gold Coast.

T. R. Robertson, M.B., Ch.B.Edin. (Colonial Service), West Indies.

Luis de Roux, M.D.Bogata (Private), Panama.

Alex. Sultana, M.D.Malta (Government of Malta), Malta.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE. —MEMOIR XIII.

Reports of the Trypanosomiasis Expedition to the Congo, 1903-1904, of the Liverpool School of Tropical Medicine and Medical Parasitology. By J. Everett Dutton, M.B. Vict.; John L. Todd, M.D.McGill, and Cuthbert Christy, M.B.Edin. With a Comparison of the Trypanosomes of Uganda and the Congo Free State. By H. Wolferstan Thomas, M.D. McGill, and Stanley F. Linton, B.Sc., M.B. Liverpool. And a Note on Tsetse-Flies. By E. E. Austen, Zoological Department, British Museum. Published for the University Press of Liverpool by Williams & Norgate, 14, Henrietta Street, Covent Garden, London. August, 1904.

In the Preface the authors remark: In 1901 trypanosomes were discovered in the blood of a European by Dr. J. E. Dutton, Walter Myers Fellow, while on an Expedition of the Liverpool School of Tropical Medicine to Gambia. In consequence of this observation an Expedition composed of Drs. Dutton and Todd was sent in 1902 by the School to Senegambia to prosecute further researches in trypanosomiasis. The detailed report of the Expedition was published in 1903, and contained a study of the pathogenic trypanosomata of man and animals, several new species being described.

Prior to the return of this Expedition, the discovery of trypanosomes in the cerebro-spinal fluid of cases of sleeping sickness in Uganda by members of the Sleeping Sickness Commission of the Royal Society caused the subject of trypanosomiasis to assume great importance. At the same time it was brought to the notice of the Committee of the Liverpool School that in the Congo Free State the native population had from time to time suffered from very fatal epidemics of this disease. The Committee therefore decided to accept the invitation of His Majesty King Leopold to send an expedition to study sleeping sickness in that country. Drs. Dutton and Todd were recalled from the Senegambia, and as soon as they had drawn up their reports they left for the Congo in September, 1903, and were soon after joined by Dr. Christy, who had served previously on the Royal Society's Sleeping Sickness Commission in Uganda. On reaching the Congo the Expedition decided to make Leopoldville its headquarters. The authorities of the Free State at the same time attached Dr. Inge Heiberg, an old pupil of the School, to the Expedition, and to him the members are greatly indebted for his aid in the work. A special hospital was erected by the State, in order that the observers might have the sleeping sickness cases under their care, and facilities were given for the study of a large number of patients. The results of these investigators are incorporated in the present volume, and illustrate the occurrence and distribution; describe the symptoms of trypanosomiasis in all its stages, both in Europeans and natives, and show how sleeping sickness, so-called, is related to trypanosomiasis as a symptom of that disease.

At the same time the Committee resolved to continue the researches on trypanosomiasis in Liverpool, which had been started by Drs. Dutton and Todd in Senegambia; Dr. Thomas was appointed to conduct the work, and aided by Dr. Linton, experiments were immediately commenced, a preliminary note of their work being embodied in this report. The two groups of observers have throughout worked together, and in order that comparable data might be obtained, selected cases of sleeping sickness were, by permission of the Congo Free State authorities, sent to the observers in Liverpool. A later report will be published on these cases. As far as the very numerous and detailed observations of these workers go, they show that the parasite identified with sleeping sickness in Uganda and the Congo does not differ from that described by Dutton in the Gambia. This view is also held by Laveran and Mesnil in France, and Bruce in this country. The question of a curative agent has for a considerable time engaged the attention of the members of the research, and experiments are now in progress to find a remedial agent which would have the same effect in trypanosomiasis that quinine has in malaria. A variety of drugs have been used with more or less success; up to date, arsenic and trypan red, an aniline dye introduced by Ehrlich and Shiga, appear to be the most useful; the parasite disappears for a time from the blood, and the life of the animal is prolonged, but with neither of the drugs is an absolute cure attained. A combination of the two appears to offer better results; a large number of animals infected with different trypanosomes are under treatment. The present report also embodies an important note on the Tsetse-flies, by Mr. E. E. Austen, to whom the School is much indebted for describing and identifying the diptera obtained during the Expedition.

Much important work remains to be done; a further study of the disease from a clinical aspect, extended experiments on the transmission of trypanosomic diseases by biting flies, and researches on the lines of Schaudinn's work, together with therapeutical observations in patients and large animals naturally infected with trypanosomes, are urgently needed.

Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India. New Series. No. II. On a Parasite found in Persons suffering from Enlargement of the Spleen in India. Second Report by Lieut. S. R. Christophers, M.B., I.M.S. (on special duty). Calcutta: Office of the Superintendent of Government Printing, India, 1904.

Conclusions.

(1) The bodies described by Wright in tropical ulcer are indistinguishable from those found in cases of enlarged spleen in Madras. In both cases the bodies are for the most part included in the cytoplasm of cells of endothelial nature. In tropical ulcer the bodies appear to be giving rise to a lesion of a distinctly granulomatous type.

(2) In so-called malarial cachexia of India the bodies are very numerous in the spleen, liver and bone-marrow. They are in considerable numbers, in some cases at least in the lungs and testes. In the

kidney they do not appear to be in large numbers. In the above-named viscera they may occur in leucocytes, but for the most part they are seen in cells of endothelial nature, especially in large cells crowded with the bodies (macrophages).

(3) Bodies may be present in large numbers in the granulation tissue associated with ulceration of the large intestine in cases of so-called malarial cachexia.

(4) Bodies may generally be found in small numbers in the granulation tissue of small and larger ulcers, and in unulcerated papules in the skin of advanced cases of so-called malarial cachexia. In this case, as in the testis, the bodies are found for the most part lying singly in endothelial cells of the finest capillaries.

(5) Bodies were found in a lymphatic gland which drained a skin lesion containing the bodies. They were not found in a lymphatic gland draining only normal skin.

(6) Bodies may be found in leucocytes in the peripheral blood. I have not seen unmistakable forms in red cells either in peripheral or splenic blood.

(7) The vast majority of the bodies lie in the cytoplasm of endothelium cells. The cachexia is essentially an infection of the vascular endothelium and resembles in many ways a chronic septicæmia.

(8) The process of infection appears to be as follows. Bodies are taken up by, or invade, endothelium cells in the visceral and certain other capillaries, *e.g.*, granulation tissue. The endothelium cells increase in size and become more and more distended with the parasites (macrophages). The cells finally undergo necrosis and appear as mere bags filled with large numbers of the parasites. Eventually such cells would appear to rupture and the contained bodies, which exhibit no trace of intracellular digestion, are thus set free to be taken up again by cells.

Splenic Anæmia.

Springthorpe, J. W. Six Cases of Splenic Anæmia in One Family. *Intercolonial Medical Journal of Australasia*, July 27, 1904. — Three sisters, one brother, and the son and niece of the brother, developed splenic anæmia, their respective ages being 28, 19, 23, 30, 7 and 10. Two of the patients had the spleen removed, and were well twelve months after the operation. In the same journal Dr. H. Sexten gives "Notes on a Case of Splenic Anæmia," and Dr. A. Lewers "Notes on a Case of Leucocythæmia." It would be wise to entertain the possibility of the presence of the Leishman-Donovan body in these Australian cases.

Malarial Prophylaxis.

The employees on one of the Italian railways have well-nigh got rid of malarial fever, by having their houses rendered mosquito proof. On this railway sixty-nine persons suffered from malarial fever in 1900 against four in 1903. Compared with the officials on another railway company who neglected mosquito protection, the results are very encouraging. On the latter railway the number of cases of malaria were 33 in 1900 and 210 in 1903. The authorities find also that the men and their families when protected from mosquitoes are much more healthy generally and capable of more work.

In the Italian Army prophylaxis by means of quinine has been tried and with excellent results. The number of cases of malaria (fresh and recurrent), amongst the troops experimented upon in 1898 before quinine was given amounted to 716; whereas in 1903 after quinine was administered the number stood at 242 only. Of 19,021 soldiers to whom quinine was given as a prophylactic, 5·6 per cent. only showed symptoms of malaria.

Anti-Malarial Operations.

Giles, G. M. The Anti-Malarial Operations at Mian Mir. *Journ. Roy. Army Med. Corps*, 1904, August.—Colonel Giles in a series of articles in the Journal of Tropical Medicine dealt with the anti-malarial operations at Mian Mir. He repeats the conclusions he there announced in the *Journal of the Royal Army Medical Corps* and adds that "Canal irrigation should be absolutely effaced within the confines of every military station" in India. He states that it is not sufficient to merely divert the water from the canal in the military cantonments, but also to fill in the channel so that no puddles should collect during the rainy season.

Pressat. Prophylaxis of Malarial Fever in the Isthmus of Suez. *Presse Medicale*, 1904, July 30.—Malarial fever in Suez has been eradicated, according to Pressat, by (*a*) pouring a mixture of crude and refined petroleum in all stagnant water about the town once a week; (*b*) and by the administration of 3 grains sulphate of quinine every morning to all workmen.

Mosquito Collection.

Manders, N. On the Collection and Preservation of Phlebotomic Diptera. *Journ. Roy. Army Med. Corps*, 1904, August.—According to Major Manders, the following are the more important blood-sucking families of Diptera:—

Culicidæ.—Culex, Anopheles, Stygomyx (Mosquitoes); in the females only; larvæ aquatic.

Chironomidæ.—Ceratopogon (Midges); in the female only; larval habits not always definitely known; often aquatic.

Simuliidæ.—Simulium (Sand-flies); general in the family; larvæ aquatic.

Tabanidæ.—(Gad-flies).—Apparently general in the females.

Among other families the more important genera are: *Stomoxys, Hæmatobia* and *Glossina* (Tsetse-flies); these latter flies apparently live entirely on the blood of vertebrates; the larvæ are nourished inside the mother flies and are born as larvæ, not as eggs.

To Preserve Mosquito Larvæ.—The larvæ should be transferred to clean water, and thence to a glass tube—an ordinary test-tube, not too large, does fairly well. The mixture in the tube should be a 5 per cent. solution of formalin and clean water, which should reach as far as the cork. A 2 per cent. solution would probably do as well as a 5 per cent. It is as well to run a little sealing wax round the rim of the tube, which should have a label attached to it with the locality, altitude and date of capture recorded on it. It is well to bear in mind that an insect without a history is scientifically valueless. *Culex* larvæ can be obtained and preserved in the same way. One test-tube will do for a very large number of larvæ, if plugs of cotton-wool or tissue paper are put in between the larvæ from different localities; whichever is used, it should be tightly rolled to prevent the larvæ getting mixed up or shaken about.

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By Fritz Schaudinn (Rovigno).

(*Translated from the German by P. Falcke.*)

(*Continued from p.* 314.)

II.—Developmental Cycle of Spirillum Ziemanni (Lav.).

The history of the development of the *Leucocytozoa* of Danilewsky is so similar to that of *Halteridium*, that in this preliminary communication I shall only indicate the differences between the morphology of the separate stages of spirillum and those of the trypanosomes already described. One special difference consists in the nuclear conditions, for whereas in the trypanosomes eight chromosomes are the normal number, sixteen are present in the spirilla. The dimorphism of the nuclei, *i.e.*, the development of a blepharoplast in addition to the nucleus, coincides in both forms. The male and female leucocytozoa in the blood of the owl have already been well described

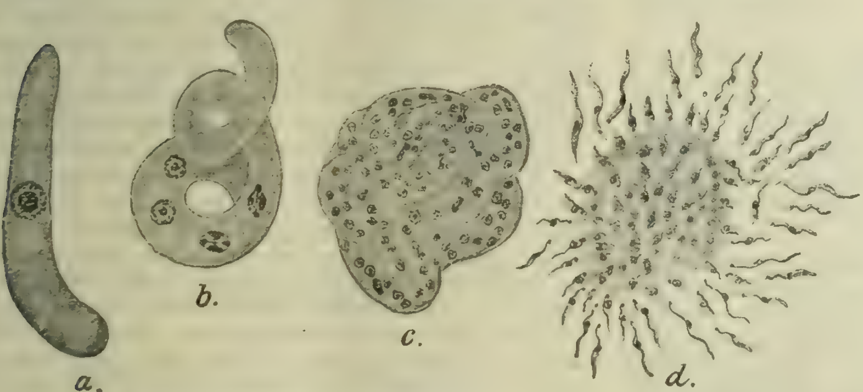

Fig. 12.—Schematic illustration of the growth of an indifferent ookinet from *Spirillum ziemanni* and the formation of the indifferent trypanosome stages therefrom.

by Ziemann, and this author has observed the formation of the microgametes out of the microgametocytes. Laveran has recently continued these observations, and recognises the fact that the condition of both forms, after their exit from the body of the bird, conforms to that of *Plasmodium*, *Halteridium* and *Proteosoma*, that is to say, he confirmed the same sexual processes in them, and therefore places the parasites in the genus *Hæmamœba* (syn. *Plasmodium*) by giving them the specific name of *Ziemanni*. As in the damp chamber the same process occurs as in the midgut of Culex, which plays the part of the transmitter, namely, the maturity of the microgametes and the formation of the microgametes from the microgametocytes, and the fertilisation of the former through the latter. Exactly as in Plasmodium, Proteosoma and Halteridium, a large ookinet is formed. Fig. 12, *a*, represents an ookinet of the spirillum which corresponds to that one from which we started in the description of the cycle of development of *Tryp. noctuæ*. The centre of the nucleus contains the karyosoma which is formed of the centrosome and sixteen chromosomes, while the sixteen nuclear chromosomes lie in the peripheral part. Moreover, one can establish a series of different ookinets according to the character of their plasma and nucleus, the extremes of which bear characteristics of the indifferent, female and male forms.

The further observation of the ookinets in the intestine of the mosquito teaches us, however, that all these stages first go through a similar period of development. In contradistinction to the ookinets of halteridium, however, those of spirillum first go through a period of growth, and thereby increase their single nucleus. I am unable to describe this process minutely without a large series of figures. It has, however, been proved that the growth is mainly in the direction of the longitudinal axis of the ookinet (fig. 12, *b*), which twists and rolls itself up into a complicated ball (fig. 12, *c*). During the multiplication of the nucleus, which corresponds to the sporoblast formation of the malaria parasite, the interior nucleus, the karyosoma, which later becomes the blepharoplast, functions as a single spindle (fig. 12, *b*). The increase of the nucleus is reminiscent of that of the coccidia, and entirely resembles the mitosis of the *Halteridium* in the maturity divisions of the nucleus of the macrogametes. The number of similar nuclei present in the balls is variable in the different sorts of ookinets. Fig. 12, *c*, affords an example of an indifferent ookinet. Each of these nuclei surrounds itself with a dense zone of plasma. These little cellular territories now develop in the same relation to trypanosomes as the entire ookinet in halteridium, and, indeed, according to the character of the original ookinets, they became indifferent male or female forms. Just as in halteridium a heteropole spindle is formed, the blepharoplast then immediately forms the flagellate apparatus in the indifferent forms, or in the female it increases to the abortive male nuclei, and in the males to the further developing male nuclei, &c., &c. Fig. 12, *d*, represents the swarming out of the indifferent flagellata, leaving behind a large residual body. The swarming out of the female and male forms, the differences of which essentially correspond to those of *Tryp. noctuæ*, takes place in a corresponding manner. All three kinds of flagellata here are, however, remarkably small, so that all their morphological details cannot be so easily confirmed as in the others.

Trypanosomes becoming Spirilla.

These minute trypanosomes, soon after they are released from the residual body, stretch considerably in length and develop into typical spirilla by rolling their ribbon-like bodies spirally along their longitudinal axes. The indifferent forms continually multiply by longitudinal division, and, as is the case in *Tryp.*

noctuæ, motile and resting periods alternate. Fig. 13, *a*, represents an indifferent spirillum greatly enlarged. One recognises all the peculiarities characteristic of the *Tryp. noctuæ*, namely, blepharoplast, undulating membrane, and its continuation as a flagellum.

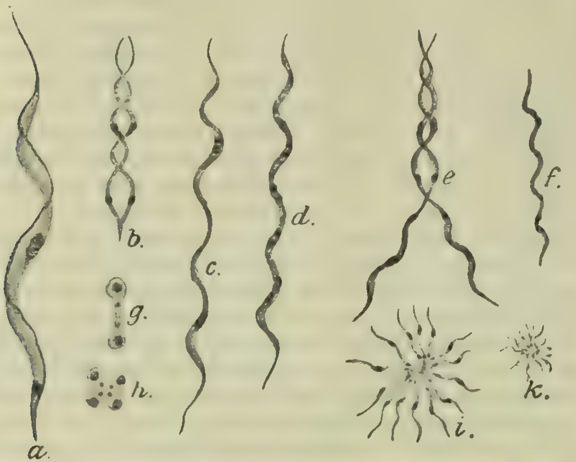

FIG. 13.—Various stages of indifferent spirilla from the body of the mosquito.

a, A single parasite, greatly enlarged; *b*, stage of fission; *c*, two parasites which have remained attached by the posterior extremities after division (actual spirillum stage); *d*, a stage similar to *c*, but the two parasites are in the act of commencing division (nucleus and blepharoplast divided); *e*, stage of division following *d*; *f*, smaller spirilla; *g*, resting stages of *f*; *h*, resting stage of a condition like fig. *e*; *i*, agglomeration by the posterior extremities of indifferent spirilla; *k*, agglomeration of much smaller parasites.

The female forms are larger, their plasma darker, the nucleus and blepharoplast relatively small, the border of the undulating membrane does not continue as a free flagellum. The males are so small as to be hardly recognisable (fig. 13, *k*). Their movement resembles that of the other trypanosomes, being with the flagellate extremity forward. It is well known, however, that *spirillum* can move backwards as well as forwards with a screw-like motion. These stages are found in this form, and indeed at all periods of propagation. They are accomplished by double creatures the posterior extremities of which are connected and which can thus move backwards or forwards. In contradistinction to *Tryp. noctuæ*, the indifferent forms of *Spirillum* have the special peculiarity that the two individuals originated by longitudinal division remain so long connected by their posterior extremities till each one has again divided. Fig. 13, *c-f*, must here suffice to illustrate this characteristic peculiarity of the genus *Spirillum*. I must here mention a second characteristic difference of *spirillum* to trypanosomes of the halteridium of the owl. Whereas the flagellata of halteridium before perishing agglomerate with their anterior extremities, the agglutination of the *spirilla* of the owls, like that of the trypanosomes of mammals (according to Laveran and Mesnil), always takes place with the posterior extremities. Fig. 13, *i* and *k*, illustrate such rosettes of agglutination of *Spirillum ziemanni*. The twin individuals agglomerate into irregular balls, an appearance long known in the spirillum of relapsing fever. I may mention that, for purposes of comparison, I also examined *Spirochaete obermeieri* and Sacharoff's spirochaete of geese, and was able to confirm the fact that in the foundations of the morphology, such as nuclear conditions, flagellate apparatus, &c., both forms completely correspond with those of *Spirillum ziemanni*.

VARYING DIMENSIONS OF PROTOZOAL PARASITES.

In order to trace the differences of species of the three kinds one must, however, first follow their history of development. In consequence of their mainfold multiplication, the indifferent spirilla in the intestine of the mosquito become remarkably minute. I have even found forms that had become so attenuated that they could only be recognised by their movements or in agglutinated heaps, but not as separate individuals. According to my reckoning, it is possible for such forms to even penetrate through a Chamberland filter. On the grounds of these studies, I have arrived at the conclusion that there are parasitical protozoa that in one condition are no longer optically perceptible, whereas in other stages of development they represent large forms which are easily recognisable. I therefore think it is no longer proof against the protozoal nature of an exciter of disease when it can pass through our finest filter apparatus. The swarming out of the spirilla from the ookinet balls takes place at the end of the first period of digestion of the mosquito, whereas the trypanosome of the halteridium attach themselves to the epithelium of the midgut. The spirilla of the leucocytozoa migrate into the Malpighian tubes and go to rest at and in the cells of these excretory organs. At the second feeding the multiplication is continued; at the regeneration of the epithelium of the malpighian tubes large balls of desintegrated cells are evacuated from the intestine with the parasites, which are again retained at Basili's curve of the colon. The further course of the spirilla coincides minutely with that of *Tryp. noctuæ*. Twice, however, I found the spirilla also in the salivary glands, but the glandular cells in both cases were also infected with the sporozoites of proteosoma. I believe, therefore, that this is not one of the normal beaten tracts. In the spirillum, also, and in the same circumstances as in trypanosomes, an infection of the ova takes place, but my investigations on the further development in this direction are not yet concluded.

In the infection of the owl, which can be attained by means of the bite of the Culex after the third digestion, as well as by injection of infected Malpighian tubes macerated in a solution of salts and injected with a Pravaz syringe, the period of incubation varies in a manner similar to that of the trypanosomes of *halteridium*.

As is already known in the case of the spirillum of the goose, the disease commences with an enormous increase of the indifferent spirilla. It is only after the conclusion of the acute stage that the sexual forms appear in larger numbers. Whereas *Tryp. noctuæ* is a parasite of the red blood corpuscles, *Spirillum ziemanni* (and according to my researches *S. anserina* also) live at the expense of leucocytes. I have come to the conclusion that it is exclusively the young erythro-

blasts which are still free from hæmoglobin that represent the host cells of these parasites. The principal development of the parasites in the body of the birds correspondingly takes place in hæmatopoietic organs (bone-marrow, spleen, and so on). As in the trypanosomes of halteridium so in the spirilla, periods of rest and movement alternate. Growth takes place during the former, propagation during the latter. The indifferent stages in their morphology and development entirely correspond to those spirilla found in the Malpighian tubes of the mosquito (fig. 13). In their periods of movement and fission they are found sometimes in the peripheral blood, sometimes only in the interior organs. They go to rest attached to the erythroblasts in the interior organs, and they attach themselves to the posterior extremity, contrary to *Tryp. noctuæ.* The sexual forms are distinguishable from the indifferent forms, from the ranks of which they are recruited, by their remarkable growth. I have not observed in their history of development any essential differences between them and the trypanosomes of halteridium. The flagellata, which become much larger than their host cells, are no longer able to penetrate into these, but they take into their body the entire erythroblast when they pass into the stage of rest by fastening their posterior end to it and drawing it into the plasma. Here it is deposited at the border of the ectoplasm and endoplasm in the form of an elongated dumb-bell-shaped body, its plasma becomes digested, while its nucleus is again expelled, when it passes into the next period of swarming.

(*To be continued.*)

Correspondence.

BERI-BERI IN SOUTH AFRICA.

Constantinople,
October 10*th*, 1904.

TO THE EDITORS OF THE "JOURNAL OF TROPICAL MEDICINE."

Sirs,—In your issue of the 1st inst., in an interesting paper upon "Beri-beri in South Africa," Mr. Ashley-Emile writes that "on referring to the literature on the subject for the past four years, no previous mention of the existence of beri-beri as an endemic disease of South Africa appears to have been published." I would venture to point out that the literature of recent years is not wholly silent as to the presence of this disease in South Africa. In my book on "The Geography of Disease," published last year by the Cambridge University Press, I have summarised the available information on this subject in the following paragraph, which you will perhaps allow me to quote textually :—

"To what extent beri-beri exists as an indigenous disease in South Africa it is not easy to say. A few cases are admitted in some years to the Durban Hospital, and in 1898 as many as ten came under treatment, two of which were in European residents of Durban who had never been outside the colony. In some other years the few recorded examples of the disease in Durban have been recognised as importations from elsewhere. At Pietermaritzburg it is said to be far from infrequent, occurring not only among the coolie class, but also among the European inhabitants. In Mashonaland beri-beri is sometimes seen in the natives, but never in the white population."

As Mr. Ashley-Emile's cases were drawn from various parts of Cape Colony, the Basutoland border and Basutoland itself, it would seem that the area in which beri-beri is endemic in South Africa is even wider than the above summary would indicate. I can but echo the hope that others of your readers in South Africa will throw further light on this subject.

Yours faithfully,
F. G. Clemow.

64, Cannon Street,
London, E.C.,
September 23*rd*, 1904.

"Standardisation of Disinfectants."

As one of the delinquent "parties" referred to in the extraordinary letter addressed by the Chairman of the Sanitas Company Ltd., to "all Members of Parliament" (and others), under date of September 1st, we feel it incumbent upon us to summarise briefly the views which appear to us to justify our attitude, our firm having indeed taken so prominent a part in the endeavour to bring about a legal Standardisation of Disinfectants as to offer to defray, if necessary, the expenses of the investigation now being carried out by the Sanitary Institute.

In the first place, we entirely fail to appreciate the contention of the writer of the letter referred to, that the adoption of a legal standard for the protection of the public against cruel fraud, entailing possibly, and even probably, very serious consequences, can justly be represented as an interference with fair and legitimate trade in disinfectants capable of performing what is claimed for them by the proprietors, or vendors. This is, in truth, all that such a standard could possibly accomplish, and articles outside this category do not deserve either protection or encouragement. It is a truism that enormous sales are made in what are called "cheap" disinfectants, which are more or less, if not absolutely, useless for the purpose for which they are bought. That such business is detrimental to legitimate trade is an incident, but, having regard to the purposes for which disinfectants are required and used, that the public are entitled to the same measure of protection which the law provides against adulterated food-stuffs appears to us so obvious as to be outside the pale of discussion. A purchaser of butter, which is found by analysis to be adulterated with margarine, can have the vendor heavily fined, but he cannot punish the manufacturer of a disinfectant which does not disinfect. Yet no sane person will deny that the necessity for protection in the latter case is *at least* as great as that in the former; for whereas the only consequences likely to arise through the consumption of the adulterated butter can never be attended with dangerous results, the possibilities in the case of the disinfectants used to prevent the spread of disease can best be left to the imagination of the reader.

Returning to the circular letter, we fail to see why the writers "as manufacturers of practically *all kinds* of disinfectants" should claim to be, *ipso facto*, "perhaps more than anyone else in the trade, in a position to consider the question impartially"; nor can we understand what connection such irrelevant statements as that dealing with "deadly poisons (like corrosive sublimate) which, whilst powerfully bactericidal in character, are useless as oxidising agents," can possibly have with the subject under discussion. The

writers may be "satisfied that it is absolutely impossible to standardise commercial disinfectants," and they may take exception to "the conditions of such tests," but as these points form part of the question which has been referred by the Sanitary Institute to a Committee of eminent scientists, we refrain from expressing any opinion thereon; as also on the gratuitously insulting remarks made at the expense of bacteriologists and the medical profession generally, by the "unbiassed" authors of this circular letter.

Following Mr. Kingzett's example, "we are sending this letter to all Members of Parliament with the" (at least equally) "profound conviction that after its careful perusal" the great majority, if and when it comes before them, will prefer to be guided by the conclusions of the eminent scientists above referred to, rather than by the opinions and very debatable arguments (with most of which, upon excellent expert authority, we wholly disagree) put forward by Mr. Kingzett on behalf of his Company.

For Jeyes' Sanitary Compounds Company, Ltd.,
H. H. Nelson, *Chairman.*

Review.

Notes on Assouan. By G. Dundas Edwards, M.A.Camb., M.R.C.S., L.R.C.P. John Bale, Sons, and Danielsson, Ltd., 83 to 91, Great Titchfield Street, Oxford Street, London, W., 1904. Pp. 36. Price 1s. net.

Egypt is so popular a health resort at the present time that any precise information, concerning particular localities frequented by invalids, is welcome more especially when the writer is a medical man. The Assouan season Dr. Edwards tells us is from November to April. The town can be reached by rail or by river from Cairo. Historically Egypt and the Nile appeals to Europeans more keenly perhaps than any other region of the world, so that visitors, wherever they elect to reside, will find much to interest and instruct them. Assouan itself is built on the ancient city of Syene, celebrated in Ptolemaic time for its wines. The ethnologist will find recreation during his stay in Assouan in studying the racial types of human beings met with, and the biologist can be amply employed in studying the flora and fauna of the neighbourhood. The engineer will find the Assouan dam a work of abiding interest, and all visitors must be impressed with the contemplation of the most modern of great engineering works side by side with the ancient civilisation. The invalid will find in Assouan a dry and agreeable climate, comfortable and well-appointed hotels, and pleasant society. We recommend Dr. Dundas Edwards' "Notes on Assouan" to all intending travellers on the Nile.

Notes and News.

Expeditions to Study Yellow Fever in America. —The Liverpool School of Tropical Medicine intend sending out an Expedition to study yellow fever in Brazil early in 1905. In Brazil there is already a committee of French medical men at work, consisting of Drs. Marchoux, Simoni and Salimbeni. In Mexico Dr. G. Cocchi, representing the Italian Government, is engaged in the study of yellow fever.

Professor Kitasato has gone to St. Louis, U.S.A., to attend the Medical Congress.

It is reported that the Viceroy of the Province of Sze-Chuen is arranging to open a Chinese medical school, with French instructors. Apparently the school is to have an especial military object, as members of the Chinese army are to be selected and sent for instruction.

The Harben Lectures, 1904.—The Royal Institute of Public Health announces that the Harben Lectures for 1904 will be given in the large lecture-hall at King's College, on Fridays, November 25th, December 2nd, and December 9th, at 5 p.m., by Professor John McFadyean, M.B., B.Sc., Principal of the Royal Veterinary College, on "Glanders." All persons interested are invited to be present.

Colonial Appointments, &c.

Dr. M. H. C. Irving, Government Medical Officer, British Guiana, has left the colony on twelve months' leave.

Dr. J. E. Ker, the new Superintending Medical Officer of Jamaica, has left England to assume the duties of his office.

Dr. Alexander King has been appointed Second District Medical Officer for Castries, St. Lucia, and Surgeon of the prison there.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Cholera.

Bombay.—August 9th to 16th, deaths 33.
Calcutta.—August 6th to 13th, deaths 4.

Cholera in Persia.

The epidemic of cholera which has swept through Persia has been successfully warded off, it is said, from a province of which Tauris is the capital, by adopting the system of quarantine stations and by early diagnosis and segregation. The disease, however, still prevails and continues to spread through Persia; between July 26th and August 1st 417 deaths occurred from the disease at Meshed. At Merv, just beyond the Persian border, a regiment of Cossacks has become infected. The Caspian shipping passengers by the Central Asiatic railway are being strictly inspected.

Plague.

Paraguay.—Plague cases continue to appear in different parts of Paraguay. No available statistics are obtainable.

The ss. *Coptic*, on arrival at San Francisco from Arma and Japan, on August 29th, reported that a Corean passenger had died on board ship during the passage of bubonic plague.

PREVALENCE OF THE DISEASE.

India.—During the weeks ending September 10th and 17th, the deaths from plague numbered 11,191 and 10,671 respectively.

South Africa: Port Elizabeth.—Weeks ending September 10th and 17th: fresh cases 2 and 3; deaths 1 and 0.

Mauritius.—Weeks ending September 29th and October 6th: fresh cases 14 and 29; deaths 9 and 27.

Newcastle-on-Tyne.—A case of plague was removed on September 20th from the ss. *Bishopsgate*, which reached the Tyne with a cargo of wheat, maize and bran. The vessel left Rosario, in the Argentine, in July, reached Hamburg on August 20th, discharged cargo, and owing to plague-infected rats being found on board the crew was discharged; fresh hands were engaged and the ship fumigated. It was one of the freshly engaged crew who developed plague on arrival in the Tyne.

Brazil: Bahia.—August 5th to 18th, cases 17, deaths 7.

Egypt: Alexandria.—August 6th to 13th, cases 4, deaths 3.

Peru.—August 1st to 17th, cases 18, deaths 8.

Yellow Fever.

Ecuador: Guayaquil.—August 8th to 15th, 1 death.

Mexico.—August 27th and September: cases 18; death 1.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

A Fatal Infection by a hitherto Undescribed Chromogenic Bacterium-Bacillus Aureus Fœtidus.

MAXIMILIAN HERZOG, M.D., Manila. From the *Report of the Biological Laboratory, Manila*, April, 1904.—The observation recorded refers to a case of fatal human infection by a hitherto undescribed bacterium, which is evidently not very pathogenic under ordinary conditions and probably, as a rule, is a harmless saprophyte, but which, as in this instance, under circumstances especially favourable, may become parasitic and may lead to a fatal issue.

The case to be reported is as follows: On February 19th, 1904, the body of D. L., a Filipino, aged 40, was sent to the morgue at San Lazaro. No more was known about the case than that the person died rather suddenly, the suspected cause of death being plague. There was an open wound on the right leg and a marked swelling of the inguinal glands of the right side. The *post-mortem* examination was made eight hours after death.

Smears from the organs showed a small number of what appeared to be a small diplococcus or diplobacillus. No organisms showing the characteristic morphology and staining properties of the plague bacillus were found.

DESCRIPTION OF THE BACILLUS ISOLATED.

Morphology.—Short bacilli with rounded ends, varying much in size; average 1·4 micron in length, and about 0·7 micron thick.

Staining Properties.—The bacillus is readily stained by the watery aniline stains and easily overstained by the more intense solutions (carbol-fuchsin, carbol-thionin). A certain resemblance exists between it and the bacillus of plague, though the similarity is not great. Gram's method decolourises the bacillus. No flagellæ are demonstrable.

Cultural Peculiarities.—The organism on all solid media which have been tried produces an intense golden-yellow pigment, which is practically identical in colour with that formed by the *Staphylococcus pyogenes aureus*. The organism liquefies the media with great rapidity; 20 per cent. gelatine stab cultures after twenty-four hours to a great extent become fluid. The organism develops typically under anaerobic conditions in either a nitrogen or a hydrogen atmosphere. All cultures, whether aerobic or anaerobic, have a very fetid, cheesy, and somewhat cadaverous smell.

The thermal death point of the the organism was determined to be 62° C. An exposure of ten minutes at this temperature destroyed all the bacilli, while 61° C. acting for ten minutes left a number alive.

The name *Bacillus aureus fœtidus* selected for this micro-organism emphasises two of its prominent characters, its chromogenic and malodorous properties.

HISTO-PATHOLOGY.

Pieces of tissue taken at the *post-mortem* table were at once placed in Zenker's solution. They were subsequently embedded in paraffin and stained with hematoxylin-eosin-alkaline-methylene-blue, and by Gram's method. The microscopic examination demonstrates the following tissue changes:—

Liver.—The boundaries of the lobules are well marked, since the interlobular veins are surrounded by an inflammatory infiltration, the latter in general having the character of a periphlebitic cellular exudate. In a fair number of places this inflammatory process must have been going on for some time, since here the interlobular tissues show a number of fusiform connective tissue cells and fibres. When examined with oil-immersion magnification it is seen that the cellular exudate consists mainly of small round cells of the lymphoid type; here and there a plasma cell is seen. These plasma cells are of the ordinary type with a more or less square or irregular protoplasmic body, deeply staining with methylene blue and with an excentrically situated vesicular nucleus, poor in chromatin. The cellular exudate also shows fusiform cells of the type of fibroblasts, while a number of the small round cells show karyokinetic figures, demon-

strating that a lively proliferation has been going on in the inflammatory foci. The latter exhibit a considerable number of very small bacilli found in irregular groups, in groups of two, and in small chains. This micro-organism does not generally stain very well, even with methylene blue. Some, however, keep the dye fairly well.

The liver cells show distinctly noticeable, though not very advanced, degrees of fatty degeneration. This degenerative process is perhaps most marked in the centre of the lobules, though it is not confined to the central zone but may be quite diffusely distributed in some areas. The liver capillaries are distended with blood. The capsule of the liver in places shows some thickening. Where this condition prevails we find an interlobular inflammatory focus in the neighbourhood of the capsule.

Kidneys.—The majority of the glomeruli appear normal; some, however, show an increase in the nuclei of the endothelial lining of the glomerular capillaries, while in others there is a more or less marked thickening of the capsules of Bowman. We also see beginning fibrosis in the interior of the tufts. In a number of the latter the fibrosis is well advanced, and we have a complete obliteration of the capillaries. In the neighbourhood of the glomeruli, which show more or less advanced changes, and between the convoluted tubules there are seen inflammatory foci, which consist mostly of small round cells of the lymphoid type. However, there are also present some plasma cells and plasma "mast cells," and a considerable number of eosinophilic polynuclears. These foci likewise show the small, generally poorly stained bacilli. The epithelial cells lining the uriniferous tubules show cloudy swelling or vacuolation with loss of the nucleus quite extensively. Most tubules contain a granular material; some contain hyaline casts. The renal blood-vessels are all distended with blood.

Neither the liver nor the kidneys show any areas of marked or extensive coagulation necrosis, nor are areas of blood extravasation encountered, though both the kidneys and the liver show highly engorged capillaries.

Lymph Glands.—The inguinal lymph nodes show a marked increase in fibrous connective tissue. This increase is noticeable in the capsule, in the trabeculæ and around the individual blood-vessels. However, the follicles themselves show no marked fibroid changes, and the differentiation between the peripheral zone and the proliferating centre of Fleming is well preserved. The lymphoid cells are of the usual character. Karyokinetic figures are here and there seen in the proliferating centre of the follicles. The mitoses, however, are not very numerous. Occasionally an eosinophilic polynuclear is encountered. Plasma cells and plasma "mast cells" are also seen. Bacilli like those found in the liver and kidneys are encountered, nowhere in large groups or over large continuous areas, but only as a few isolated individuals here and there forming little groups among the cells. The blood-vessels of the lymph nodes are generally well filled. Hæmorrhagic areas of extravasated blood are not found.

No histologic changes are found in the pulmonary tissue. The pancreas is normal except in certain portions, where there is seen a minor degree of increase in the interlobular connective tissue.

The myocardium shows fragmentation of a marked degree, the diastases between the fragments not being very large.

A moderate number of cells exhibit a deposit of brown granules in the perinuclear zone. More or less all cells show a very fine, dust-like vacuolisation and a somewhat indistinct, hazy striation.

Animal experiments proved negative.

Conclusions.

Bacillus aureus fœtidus, the bacterium described in this paper, has, as appears beyond doubt, been the cause of death in the case herein reported. Experiments showed that the bacillus is not a highly pathogenic micro-organism, because single inoculations of moderate doses brought about only a very slight reaction in the animals experimented upon. Perhaps inoculations repeated during a longer period might bring about a more serious result.

It is very probable that *Bacillus aureus fœtidus* is ordinarily a saprophyte. In the case reported it may simply have lived for some time in the necrotic tissues of a neglected ulcer and may have slowly become modified in these environments, until it finally gained entrance into the tissues of the patient. From the lymphatic system it entered the blood current, reached the liver and kidneys, and led to subacute and somewhat chronic interstitial fibroid processes and parenchymatous degeneration.

As shown by the microscopic examination, beginning interstitial and marked parenchymatous nephritis, as well as early brown atrophy and fatty degeneration of the myocardium, must be added to the anatomical diagnosis made at the *post-mortem* table.

Blackwater Fever.

Blair, M. C. Blackwater Fever. *The Caledonian Medical Journal*, October, 1904.—Dr. Blair gives a succinct account of the disease and is inclined to ascribe this phase of malaria fever to deficiency of salts of potassium in the dietary which might act by leading to the ready breaking up of the red corpuscles and to the escape of free hæmoglobin.

Cholera-Immunisation.

Bertarelli, E. Ueber aktive Immunisierung des Menschen gegen Cholera. *Deutsche Medicinische Wochenschrift*, vol. xxx., No. 32, 1904.—Shiga's method of immunising by injection of free receptors has been tested and confirmed by Bertarelli. The test gave positive results with rabbits and guinea-pigs, and on Bertarelli himself. A modified technic is required to produce a more concentrated material for use.

Filaria.

Feldmann. Filaria Perstans in German East Africa. *Archiv fur Schiffs-und Tropenhygiene*, 1904, July.—Feldmann conducted his investigations at Bukoba in German East Africa. The infection he found to be widespread, but whether the filaria is harmless or not to the human body he has not ascertained.

Intestinal Sand.

Dr. J. C. Verco describes microscopic specimens of what has been called "false intestinal sand." It

was brought to him by a lady, aged 58, who suffered from very frequent attacks of pain in the right hypochondrium. These had come on for nine months, and from their history appeared to be biliary colic. She produced three round gallstones and about a third of a teaspoonful of sand, collected from her motions, under the impression of its being "biliary gravel." It was of a greyish colour with a tint of yellow, in roundish grains, which, under the microscope, seemed covered with minute projecting crystals. Treated with strong nitric acid the grains turned orange-brown, and there was a good deal of effervescence, and after very prolonged boiling they entirely disappeared. They were boiled in liq. potassæ, but did not alter their appearance, except to become dark brown. Incinerated on platinum they smoked, but did not appear much altered under the microscope, except that they were rather less in size and more white and chalky. Boiled in acetic acid fort. they did not seem much altered; but when now incinerated on platinum they burned completely away, and when others so treated with acid were examined under the microscope, though retaining their former shape and projections, these were seen to be composed of organic structure, with a central long cell cavity, from which, on either side, small canals extended nearly up to the surface. They were, in fact, the sclerenchymatous substance which forms the hard granules in the pear. They had been coated with inorganic salts, the carbonate and phosphate. These had dissolved in the acids, leaving the woody fibre behind. Eventually strong nitric acid destroyed this. Liq. potassæ could not reach it to dissolve it owing to its coating. When incinerated, the mineral salts remained as a calcareous mass to represent the granules; but when these salts had been dissolved off by acetic acid, and then the grains were burned, they were completely consumed. They were passed by the patient when pears were in in the market. He was completely puzzled by this material as to what it could be, until he found a paper on "Intestinal Sand," by Sir Dyce Duckworth and A. E. Garrod, in the *Medico-Chirurgical Transactions* for 1901, p. 389, where, under the heading of "False Sand," a description is given of *pear* sand, which exactly corresponded with his observations. To make the matter certain, a medical man kindly took some pears at a meal, and then collected from the fæces the sandy sediment of their washings, and provided abundance of "intestinal sand," consisting of the sclerenchymatous tissue of the pear in the grains, with projecting cells, but destitute of the calcareous coating.—*The Australasian Medical Gazette*, June 20th, 1904.

Leprosy.

United States of America. According to the *Journal of Cutaneous Diseases*, February, 1904, leprosy exists in the United States in the following places, arranged according to the prevalence of the disease: Louisiana, New York, California, Florida, Minnesota, North Dakota, Texas, Mississippi, Illinois, Missouri, Wisconsin, Massachusetts, Alabama, Pennsylvania, Georgia, Ohio, Iowa, Maryland, Montana, Nevada, Oregon and South Dakota; in all, twenty-two places in the States at which cases of leprosy are met with. Louisiana is the only centre in which a leper home exists. Measures to cope with the disease are being considered by the Government.

Russia. Legislation concerning lepers was introduced into Russia in April, 1902. Segregation is advocated, but a leper is allowed to remain in his own home so long as strict segregation is observed. When a leper is believed to be no longer infectious he is permitted to leave the asylum. Von Bergmann states that during his enquiries in Russia he discovered that about 60 per cent. of lepers were found to have been intimately associated before infection with other lepers. At Riga, according to V. Riessen, four cases of leprosy emigrated thither, and in a short time nineteen cases developed in consequence. Dehio shows that of forty-eight cases of tubercular leprosy contagion was probable in thirty-six, whilst in eleven anæsthetic cases and two cases of mixed leprosy no infection was traceable. Dehio concludes that tubercular leprosy is an infectious disease, whilst the other forms are not infectious, or only in a slight degree. He regards the question of segregation as dependent upon the cleanliness or uncleanliness of the people; amongst the latter segregation in asylums is imperative.—*Journ. Cutaneous Diseases*, 1904, February.

Dyer, I., is of opinion that cases of anæsthetic leprosy should be kept apart from persons suffering from the tubercular form of the disease, as in all probability the former may become reinfected by the latter. In Minnesota three American-born lepers of Scandinavian parentage had come under observation (Bracken) within the past two years.—*Journ. Amer. Med. Assoc.*, 1904, November 7th, p. 112.

Rodrigo, W. P. The First Theory of Leprosy, *Journal of State Medicine*, 1904, October.—In a letter dealing with Mr. Jonathan Hutchinson's article to the *Times*, January 29th, 1904, Dr. Rodrigo, of Bangkok, Siam, comes to the following conclusions: (1) Leprosy is a bacillary disease produced by the *Bacillus lepræ* of Hansen; (2) the bacillus has a telluric existence outside the human body, much like the bacillus of tetanus, and has a predilection for a fish-clogged soil; (3) it is introduced into the human system by inoculation and not by ingestion; (4) it is very slow in its growth, and attacks nerve tissues by preference. It therefore takes years before the disease shows itself after inoculation, and therefore infection is very hard if not impossible to trace; (5) the organism dies quickly outside the human body; (6) it may be possible to cultivate the organism anaerobically in a medium containing fish or nerve tissue chiefly, and in a nitrogen instead of the usual hydrogen atmosphere; (7) the disease is probably not contagious, except in the ulcerating stage; (8) the disease has disappeared from Europe, owing, undoubtedly, to improved sanitation as the chief factor, and to segregation, and not to the lack of badly cured fish as an article of diet (vide *British Medical Journal*, November 28th, 1903, p. 1437); (9) the best means of preventing the disease are by universal isolation and segregation of lepers, and by improvement in the sanitary surroundings of the community, especially of the poor.

Muzio, C. Le Malattie dei Paesi Caldi Loro Profilassi et jgiene; con un Appendice la Vita nel Brasile.

Milan, 1904, p. 562.—Surgeon Muzio, of the Italian Navy, in one of the volumes of the Hoepli series now being issued, deals with tropical diseases. The text is illustrated by many excellent charts, diagrams, and micro-photographs. The hygiene of hot climates in reference to clothing, food, dwellings, &c., is carefully dealt with; the flora and fauna of Brazil form an interesting appendix.

Liver Abscess.

Corvington. Etude der abces du foie chez l'enfant (Liver Abscess in Children). *Semaine Médicale*, vol. xxiv., No. 32.

Malaria.

Hydræmia a Predisposing Factor. Cadwaller, R. Malaria, *Medical Record*, 1904, September 14.—In a paper read before the Northern District California Medical Society, Dr. Cadwaller gives his experiences and opinions in regard to malaria, its prevalence and type. Simple tertian is the only form of malaria parasite he met with in the examination of 251 cases in the district of Northern California, in which he practises. Malaria seems to be increasing in the district, owing to the extensive irrigation of the land. Already malaria prevails as a scourge, second only in importance to tuberculosis, in some parts of Southern California. Dr. Cadwaller is of opinion, and advances proofs to maintain his belief, that free drinking of water, by inducing hydræmia, predisposes to malarial attacks. He founds his opinion upon the following facts: (*a*) Persons who drink large quantities of water have the severest forms of malaria attacks; (*b*) persons who consume large quantities of water-melon (*i.e.*, water) have fever most severely; (*c*) malaria attacks find relief in getting rid of excess of fluid in the system by profuse sweating, by increased urination, or by an intestinal flux; (*d*) cool weather, by stopping sweating, is the period of the year when malaria attacks mostly prevails; (*e*) all specifics for malaria, such as quinine, arsenic; all sudorifics, such as antipyrin, phenacetin, and all purgatives, tend to the elimination of the excess of fluid from the system, thus reducing hydræmia. Dr. Cadwaller further insists upon the long continuance of malaria infection and upon the effects of chill in developing an attack of fever. He is not impressed with the periodicity of malaria fever. Treatment: Quininæ sulph., grs. iv.; pulv. capsici, gr. i.; in capsules every three hours. With each capsule give sodii bromidi, grs. iv., aquæ ʒi., to allay unpleasant head and ear symptoms. To obtain free catharsis, give one or two grains calomel and extracti colocynthidis co. every two hours until free purging obtains. To lessen fever, any one of the synthetic pyretics is recommended.

Dr. Cadwaller sums up in conclusion thus: that a pre-requisite to infection, or at least to symptoms of malaria, is a watery condition of the blood; and just in proportion to the total fluid in the body will be the severity of the disease.

Solis-Cohen, S., and Rosenberger, R. C. Case of Splenomegaly, with Blood Changes and Symptoms resembling those of Banti's Diseases. *Amer. Journ. Med. Science*, 1904, August.

Plague.

Queensland.—Up to the week ending June 11th, the total number of cases of plague that have occurred in Brisbane since February 10th, 1904, amounts to 21, and in Cairns since February 16th, 1904, the plague cases numbered 2. Rats examined at Bacteriological Institute, 272; rats infected, 16; mice examined at Bacteriological Institute, 169; mice infected, *nil;* rats destroyed, 213; mice destroyed, 235.

EXCHANGES.

Annali di Medicina Navale. Annali d' Igiene Sperimentale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Medical Gazette. Indian Medical Record. Interstate Medical Journal. Janus. Journal of the Royal Army Medical Corps. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Transactions of the American Microscopical Society. Treatment.

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Original Communications.

ON AN ENDEMIC FORM OF ENLARGEMENT OF THE OS CALCIS.

By C. M. MacLean, M.D.
Kaziankor, Gold Coast, West Africa.

[We are indebted to Professor Adami, of McGill University, Montreal, for having forwarded this interesting communication. We hope to publish drawings illustrative of the condition described by Dr. MacLean in an early issue.—Ed., *J. T. M.*]

Not having encountered any description of the condition I am about to describe in the ordinary works upon Tropical Medicine, I deem it useful to record the following observations, even though I may be unable to throw any light upon the nature of the process.

During the last eighteen or twenty months, while stationed at Kaziankor, on the Gold Coast, I have noticed a number of cases of peculiar enlargement of the os calcis. The subjects of the condition have been, in the main, Wassans, a tribe of Fantis inhabiting this section of the Gold Coast. The disease, however, is not confined to them, for I have met with six similar cases among the Kroos brought to work in the mines here from a district on the coast of Liberia, some distance inland from Cape Palmas, and one well-marked case occurred also in a Bassa from the same region. The subjects are most often young males between the ages of thirteen and thirty, but females also may be affected. With one exception in the cases seen by me, the disturbance has been limited to the os calcis, and, what is more, the enlargement or overgrowth of the bone affects always the external surface of the same. Both heels may be enlarged, or only one; if both, the enlargement is not symmetrical, one being more affected than the other, sometimes the right and sometimes the left, though it may be laid down that more often the right shows the greater deformity. In the one exceptional case, which will be described in a little more detail later, the tarsal bones were also affected.

Little information can be obtained from the natives regarding the onset of the condition. About all that they can tell is, that months or years ago the heel was painful for three or four "moons," and during this period the enlargement on the outer side made its appearance. In general there has only been a single attack. Some of the patients also stated that the attack was preceded by itchiness lasting for about three days, when it became replaced by pain in the part. I have been able to observe a few cases from a relatively early period, and in these I could see no evidence of any insect bite over the diseased area, nor was the skin broken. All—or nearly all—the cases so seen developed during the "rains." There was moderate fever at the onset, great tenderness over the os calcis, and local pain in some cases so severe as to prevent sleep. In this acute stage the patients could not walk, or if it was necessary to do so, only touched the ground with the toes. In from three to seven days the bone began to enlarge, and continued to increase in size for about two weeks, though some of those affected state that increase in size continued for a month. With the enlargement of the bone the pain lessened, but still remained present, and now the temperature fell to normal, or, to be exact, it did this in the few cases seen at this stage. After reaching its maximum size, the enlargement continues unchanged for one or two months; the pain is now more moderate and the individual is able to walk, and may venture to work, especially during the latter part of this period.

Following upon this, there is gradual diminution in the size of the os calcis and the pain gradually disappears, so that, usually by the end of the fourth month, there is no longer any pain or tenderness and the enlargement is, perhaps, half of what it had been. The patient feels well and, save for the deformity, the foot is as useful as ever.

Recently, in passing through a small village fourteen miles from here, I observed a case differing somewhat from the above description. This native, a male, had the disease in both heels with marked enlargement of the external surfaces of the bones of both feet. So great was the bony outgrowth that it almost reached the end of the fibula, and one could barely pass the tip of the finger between the two bony points. In this case there was, in addition, a pronounced overgrowth of the skin over the os calcis and part of the tarsus of either foot. The skin was dark greyish, frosted, thickened and very hard, so that to rub one's finger over it was like rubbing it over a rasp. The skin on the soles was smoother. This, indeed, is the only case in which there has been noticeable disturbance of the skin. Here any pressure on the os calcis or tarsal bones caused considerable pain, but the metatarsals were free from tenderness, and in addition the ankle joint was not affected. Here I may note that in none of my cases did I find this joint other than normal. In consequence of the pain the patient walked with considerable difficulty, supporting himself on two sticks. The history, gained through the interpreter, was that the first attack occurred ten or twelve years ago during the rainy season, and that each year since that time during the rains he had suffered. The pain would increase for about a month, gradually declining during the following three months. During the rest of the year he would generally be fairly comfortable provided he did not wet his feet with cold water. If he did this, he stated that it always brought on pain. To test his statement, I offered him a "dash" (money) if he would allow them to be wetted in my presence. He, however, declined, saying that if this were done, he would not be able to sleep a moment all night. I gathered that it was cold rather than moisture to which he was so sensitive. He stated that during the first two years the trouble was limited strictly to the heel, but later the instep also became affected and now caused him fully as much pain as did the heel. It had been somewhat continuous during the last twelve months, most severe during the rainy season, but still present in the eight months during which in previous years pain had been absent. His age I judged to be between forty and fifty, and save for this and for fever (probably malaria) he stated that he had had no illness.

To sum up, the main features of the disease are:—

(1) Enlargement of the os calcis affecting, without exception, the external aspect of the bone.

(2) This overgrowth, with one exception, is found to be limited to this one bone either of one or of both heels. In the exceptional case the tarsal bones were also enlarged.

(3) The ankle joint and metatarsal bones are never involved.

(4) The enlargement comes on with relative suddenness, is preceded by a moderate fever, is accompanied by very considerable pain and tenderness and reaches its maximum in from two weeks to a month; following which, after an interval of from one to two months, there is a partial diminution in size.

A CASE OF DIAPHRAGMATIC EMPYEMA.

By John Catto, M.D., D.P.H.
Singapore.

Early on August 18th, 1902, I was called to see M. S., aged 56.—He was an Irishman, a foreman labourer, and formerly a soldier. He had made a continuous stay of thirty years in the East, and had suffered from malaria and dysentery in India. He looked much older than his years. He was a spare man of tall stature, and had been ailing for some time. He had ectropion and epiphora. An examination four months before, revealed considerable lesions in his vascular system. The venules of his face were dilated, and his arteries were atheromatous. His pulse was irregularly intermittent. His apex beat was diffuse, and well outside the nipple line. Systolic and diastolic bruits almost completely replaced the sounds at the aortic base of a dilated heart. He was of constipated habit. His liver was slightly enlarged, the anterior border being palpable below the costal margin.

His present complaint was a severe, almost unbearable pain in the lower part of the right side of the chest. The pain was continuous, with exacerbations, and was worse on deep breathing and movement. He had orthopnœa with tenderness of his lumbar and dorsal spinal muscles. The pain had come on suddenly during the night. There was no vomit nor cough, and his temperature in axilla never rose above 99° F. The pain a week later was diffused all over the back. The physical signs present were slight dulness at the base of the right lung, with a few fine distant crepitations. There was no albumen in the urine, and no pain was elicited on palpating his liver and kidneys. The dulness did not increase, and the breath sounds were never absent. His pulse was quick, very irregular and intermittent. The apex beat was well outside the nipple line, and the bruits as above noted. A diagnosis of patchy pneumonia was made. Stimulant treatment was given, with opiates and anodynes for the pain. His condition became worse, and he was admitted to the general hospital on August 27th. He gradually became weaker, and died on September 3rd. Four days before his death persistent hiccough became the most prominent symptom. The night before he died he suddenly coughed up about a pint of very foul-smelling purulent material.

To Dr. I. M. Fraser I am indebted for the *post-mortem* notes: "There was an abscess cavity between the upper surface of the diaphragm and under surface of the right lung, bounded by pleuritic adhesions. No communication with the liver, which showed no sign of any previous abscess, could be detected. The abscess had ruptured into the lung."

The interest in the early stage was the diagnosis. Liver abscess was negatived by the absence of pain in "shoggling" that organ[1]; pulmonary apoplexy, by the want of its concomitant symptoms,[2] and I thought pleurisy contra-indicated by the physical signs, as the outward displacement of the apex beat of the heart was believed to be wholly the result of cardiac trouble. Diaphragmatic pleurisy was not thought of.

Though it is difficult to exclude former liver trouble from any case of pyothorax occurring within the tropics, the following is the apparent solution: The pain and crepitation were due to diaphragmatic pleurisy, which was followed by an effusion that became purulent, and ultimately burst into the lung.

YELLOW FEVER.

Contribution to the Serum Agglutination Phenomena of the Icteroid Bacillus.

By Ulysses Paranhos, M.D., and Azurem Furtado, M.D.
Assistants in the Pasteur Institute, S. Paulo (Brazil).

The phenomenon of serum-agglutination is well known to science. It was first observed in 1889 by Charrin and Roger, when they studied the pyocyanic bacillus; it was further improved upon and repeated by Metchnikoff, Issaef, Grüber and Durham. In June, 1896, Widal announced his discovery of agglutination as a means of diagnosis in typhoid fever.

It was thought at first that the bacillus was only agglutinated by its own specific serum, but this fact now-a-days is not admissible. Bruce's bacillus is agglutinated by normal serum; the bacillus of carbuncle by the serum of the staphylococcal infections; the bacillus of cholera by inert substances, as, for example, formaline and acetic acid. We now present another case of bacterium agglutination by serum foreign to the disease.

The Agglutination of Sanarelli's Bacillus by the Anti-ophidical Polyvalente Serum.

Sanarelli and Mendonça demonstrated that the bacillus of yellow fever was agglutinated by the serum from the blood of persons suffering from the disease. Bonilha Toledo furthur showed that agglutination also occurred with the serum of hog-cholera. We (the authors) have, however, now shown the occurrence of agglutination of the bacillus of yellow fever when exposed to the serum of animals rendered immune to snake poison. We employed, in our in-

[1] Lectures on Liver Abscess, by Mr. Cantlie, "London School of Tropical Medicine."

[2] "Allbutt's System of Medicine," vol. vi., p. 261.

vestigations, cultures of icteroid bacillus isolated by Professor Bandl of the Pasteur Institute, and the polyvalente anti-ophidic serum of Dr. Vital of Brazil, derived in equal quantities from animals immunised against botrophic and crotalic snake-poison. The technique we employed was as follows:—

Into sixteen sterilised tubes of equal capacity containing simple broth we deposited a definite quantity of Sanarelli's bacillus, and over this the following quantities of anti-ophidic polyvalente serum:

1st tube: 2 drops of serum over 10 drops of culture (dilution to 1: 5).
2nd tube: 1 „ „ „ „ 10 „ „ „ „ to 1 : 10).
3rd tube: 1 „ „ „ „ 15 „ „ „ „ to 1 : 15).
4th tube: 1 „ „ „ „ 20 „ „ „ „ to 1 : 20).
5th tube: 1 „ „ „ „ 25 „ „ „ „ to 1 : 25).
6th tube: 1 „ „ „ „ 30 „ „ „ „ to 1 : 30).
7th tube: 1 „ „ „ „ 35 „ „ „ „ to 1 : 35).
8th tube: 1 „ „ „ „ 40 „ „ „ „ to 1 : 40).
9th tube: 1 „ „ „ „ 45 „ „ „ „ to 1 : 45).
10th tube: 1 „ „ „ „ 50 „ „ „ „ to 1 : 50).
11th tube: 1 „ „ „ „ 80 „ „ „ „ to 1 : 80).
12th tube: 1 „ „ „ „ 100 „ „ „ „ to 1 : 100).
13th tube: 1 „ „ „ „ 150 „ „ „ „ to 1 : 150).
14th tube: 1 „ „ „ „ 200 „ „ „ „ to 1 : 200).
15th tube: 100 drops of Sanarelli's culture (control).
16th tube: 100 drops of polyvalente serum (control).

Microscopic evidence of the agglutination occurred in from ten to fifteen minutes, when the icteroid bacillus could be seen agglomerated in masses in the most perfect agglutination. The phenomenon varied according to the dilution; up to 1 : 50 dilution the result was quite perfect, from 1 : 50 to 1 : 200 the agglutination was less perfect, and after the latter dilution it proved altogether negative.

Macroscopically *in vitro* the agglutination was not apparent until after eight or ten hours. After ten hours the broth in the tubes appeared perfectly limpid and transparent, with the bacilli deposited at the bottom. The serum agglutination, therefore, of the icteroid bacillus is complete when the dilution is from 1 : 5 to 1 : 50; between 1 : 50 and 1 : 200 dilution, the agglutination is incomplete; and over 1 : 200 negative.

Kala-azar.—Hewlett, R. T. The New Parasite o Kala-azar. In the *Journal of State Medicine*, October, 1904, Hewlett deals with the various theories that have been advanced concerning the pathology of kala-azar. There seems little cause to doubt the belief entertained that the Leishman-Donovan body is the cause of kala-azar. The "body" is presumably a true protozoal parasite, and although the insect by which it is probably conveyed has not yet been discovered, it has been found that segregation of the sick is an effective method of checking the spread of the disease.

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THE

Journal of Tropical Medicine

November 1, 1904.

THE REARING OF FOREIGN CATTLE IN TROPICAL CLIMATES.

The reports of the Government of the Philippines concerning cattle breeding and rearing are interesting, although to the agriculturalist and dairyman they must prove disappointing and depressing. In Hong Kong also a contemplated extension of foreign cattle breeding and rearing for purposes of supplying beef and milk has for some time been under consideration. It is many years ago since American and Australian cows of European stock were brought to Hong Kong for dairy purposes, and they continue to be imported by one or two dairy farm companies in the Colony. With foreign cattle as with human beings foreign to the tropics, it is not the climate but the endemic diseases of the Tropics that present the difficulty. Epidemics of illness occur amongst the cattle from time to time with disastrous effects, and the expense of replacing cattle in China that have to

be imported from countries so far distant as Australia or the Pacific littoral of North America, almost bars success from a commercial point of view, and renders at all times the quantity and quality of the milk supply precarious. It is no doubt with these considerations in view that the question of cattle breeding locally is being considered in both Manila and Hong Kong. The difficulties from disease would seem at present insuperable. Under the term "Rinderpest" in cattle, in the Tropics at all events, is grouped as many different ailments as were at one time arranged under the name of malaria in human beings. It is "Rinderpest" which clears out the cow-sheds and renders the consumption of milk dangerous; and it is the nature of this scourge in cattle that must be elucidated if we are to entertain hopes of success in the future of maintaining European-bred animals in tropical countries.

The epidemic diseases which are known to attack foreign cattle in tropical countries are true rinderpest, hæmorrhagic septicæmia, pyroplasmosis, and trypanosomiasis. To these might be added several others, such as tuberculosis. Before, therefore, expending money upon importing cattle on a large scale for slaughter or for dairy purposes, a careful study of cattle diseases and their prophylaxis should be instituted. Investigations in this direction are proceeding in Manila, with the result that it has been found that there exists, in this part of the world, a group of complex and obscure diseases in cattle hitherto grouped together under the heading "Rinderpest." This, in itself, is a great step, but it is necessary now to differentiate these diseases and to consider how immunity is to be accomplished. There seems no doubt that the native cattle in China are immune to some extent at least to several ailments. Cattle which appeared quite healthy were taken from Hong Kong to Manila and their blood injected into foreign cattle recently arrived from America. The result was a deadly infection of the foreign animals with "rinderpest." But the suspected "rinderpest" proved to be identical with Texas fever, and the belief which obtains at present is that Chinese cattle are immune to attacks of Texas fever, but that their blood injected into foreign imported cattle sets up the disease actively. The tick necessary for the spread of Texas fever is present in the Philippines, and probably in South China, so that, even if the pyroplasmal disease is not already in the Far East, given the importation of American cattle and the presence of the necessary tick, the spread of the disease is pretty sure to follow.

The breeding and rearing of cattle is an important factor, to Europeans especially, in the food supply of the Far East. Not only are the European residents deeply concerned in the matter, but the increasing armies and navies of the various powers in the Far East demand an increasing amount of fresh meat. Sheep there are none; the geographical distribution of the "domestic" sheep showing that in Japan, in Formosa, in Mid and Southern China, Annam, Tonquin and Cambodia, and in the islands of the Pacific, sheep cannot be reared. In time it is possible sheep may be reared, but it will necessitate a radical change in the agriculture of the Far East, as the kind of grass which is necessary for the maintenance of sheep does not grow in these regions naturally. Having no sheep, therefore, to draw upon for food, and with an inferior kind of native cattle, except a small supply of so-called "Kobe beef" from Japan, the question of the rearing of cattle in the Far East is likely to become a political factor of no little importance. A study of the epidemic diseases prevailing amongst native cattle and likely to attack imported animals is therefore an important one, and promises to become still more important in the immediate future. It is not altogether the quantity of animal food obtainable that has to be considered: its quality is an essential element in the maintenance of physical stamina, and the difference between a piece of meat from a native- and a foreign-bred animal is so marked, not only as regards its taste and toughness, but also in regard to its nourishing properties, that it may mean the capability or incapability of a European standing the deteriorating influence of a moist tropical climate. No doubt in time the pathology of the diseases of animals will be cleared

up, but the matter is pressing, and we can imagine no more useful object for the investigation of a scientific commission of trained experts than that of the diseases of "domestic" animals in the Far East with a view to increasing the food supplies of Europeans in these regions.

THE RECRUDESCENCE OF PLAGUE IN INDIA.

There are unhappily only too many indications that plague in India during the coming cold weather will be more widespread than in previous years, and the mortality is already mounting up, though the autumn has scarcely begun. It is the number of centres of infection in rural areas, as distinct from the great towns, that gives cause for anxiety. In September, 1903, the actual number of deaths was higher than seems likely to be recorded this month, but this was due to the excessive mortality in the Bombay Presidency. Later on plague reappeared in the United Provinces and the Punjab in a most virulent form, and all efforts to check its advance proved futile. In the Punjab especially, it swept over whole districts, and even invaded the canal colonies, which usually enjoy immunity from epidemic disease. The Province suffered more severely than any other part of India, and it was not until the summer was well advanced that the mortality began to decline. Even so late as the first week in June 1,000 deaths per day were reported. This was the third year of plague in the Punjab, and it is calculated that at least a million people have perished during the period. This means that nearly five per cent of the people have died, for the population is approximately 21 millions. One may well stand almost appalled at such a calamity, and the reality of it has been brought home by the official statements regarding deserted villages, and crops standing unreaped for want of labour. The Executive Government has done its best to help the people and stay the progress of the disease, but it is Nature alone that calls a halt in the mortality for a few months in the year. All that medical and sanitary science can suggest has been tried, but still there is no sure remedy forthcoming, though inoculation unquestionably gives considerable protection. In the towns success is often achieved, but it is in the thousands of scattered villages that the Medical Officer and the district official find themselves helpless.

The people themselves have behaved with a noble courage in many instances, as becomes the hardy races to which they belong; but in the tracts that had been most infected they have almost given way to despair. They see that even the Government, in whose marvellous influence for good or evil they have had the most implicit faith, cannot ensure that plague shall be stayed; and they accordingly cling to ceremonies and superstitions connected with the treatment of the sick and the burial of the dead that are calculated to facilitate the spread of the disease. It is easy to blame them and to issue warnings as to the disposal of biers and cere-clothes, but science has in the end to admit that plague has set its canons at defiance. It will ravage healthy districts and leave notoriously unhealthy tracts alone; it will suddenly die out for a year, or even more, and then reappear in more virulent form than before; it will spread to the north and not to the west, as instanced by the immunity enjoyed by the Frontier Province; it will depopulate irrigated lands and equally villages in the midst of sandy wastes; it will spare a big city like Delhi and yet take heavy toll of other towns. Our knowledge of its extraordinary and mysterious action is of the crudest kind; and yet for seven years it has been present in India in epidemic form. Writing on the subject so far back as June, we suggested that the time had come for a fresher view of the policy of the Government in regard to plague, and, above all, for a thorough and, so far as possible, exhaustive study of the etiology of the disease. This seems to be the conclusian arrived at by the Punjab Government also, which recently addressed the Government of India on this very point. It was pointed out that further inquiry on scientific lines into the origin and spread of plague seemed to offer the only chance of acquiring real knowledge as to the best means of preventing or checking it; and that with this end in view the services of medical men of the highest reputation in England or on the Continent should be obtained to enquire into the etiology of the disease in different parts of India. These experts would work independently in districts where plague was prevalent, and their conclusions would have the value always attaching to separate investigation. The proposal has, we understand, been accepted by the Government of India, and it will remain for the Secretary of State to sanction it and select the men. Expense in this matter is really a minor consideration; absolutely the best medical and scientific men must be engaged, and we doubt not that their services can be obtained. The Punjab alone can find employment for three such experts, while in the Bombay Presidency, the United Provinces and elsewhere, others could profitably be set to work. We welcome this action on the part of Government as the most practical step that could have been taken, and it will certainly win full public approval. It will soon become widely known among the educated native classes, and these again can use their influence to reassure the mass of the people in plague areas. The fight with the disease must not be given up, for the adoption of a policy of despair might have disastrous results.—*The Pioneer Mail*, September 30, 1904.

Sleeping Sickness, a Curative Serum.—Laveran is stated to be experimenting on Cynocephales monkeys with the idea of procuring a serum for treating sleeping sickness. Several monkeys infected with trypanosomes have been reported cured by serum prepared from blood of inoculated monkeys. We await the practical test of the serum in cases of sleeping sickness in man, with interest.

Translation.

CHANGE OF GENERATION AND HOST IN TRYPANOSOMA AND SPIROCHAETE.

By Fritz Schaudinn (Rovigno).

(*Translated from the German by P. Falcke.*)

(*Continued from p.* 327.)

Motile Macrogamete.

Fig. 14*a* represents an adult macrogamete in the motile condition. One may here observe the endoplasm loaded with reserve material, the relatively small nucleus and the little blepharoplast. The body is flattened tape like, the right lateral border forms an undulating membrane which in the female does not continue into a flagellum. The myonemes of the periplast, corresponding to the sixteen chromosomes, is found to the number of eight on each side of the body. Fig. 14*b* illustrates a spiral turn of the body during motion. The stage is just in the act of passing over to the resting condition; it has attached itself to an erythroblast by its posterior extremity. Fig. 14*c* represents the resting stage. The periplast has transformed itself into the protecting sheaths of the creature before the next period of rest, it perishes before the next resting period, and only the blepharoplast remains of the entire flagellate apparatus, and which during the resting period has moved close to the nucleus. During the next stage of movement, it forms the entire flagellate apparatus anew in the well known manner. To the right at the border of the endoplasm loaded with reserve material, one may observe the elongated nucleus of the erythroblast that has been taken up. These complete forms are then found in the peripheral blood. At the maturity and fertilisation of the macrogametes after the expulsion from the body of the bird, the ectoplasmatic sheath is cast off with the rest of the erythroblast as is the case in the transition to the trypanosome stage. The parthenogenesis of the female forms takes place in a manner similar to that of the halteridium and induces the relapses. Here also, corresponding to the multiple increase after the fertilisation, a fission into many stages of division takes place. The microgametocyte in motion is illustrated in fig. 14*d*. It is smaller than the female, its endoplasm is light and free from reserve materials. The nucleus and blepharoplast are relatively larger, the undulating membrane is more powerfully developed and its thickened border extends beyond the anterior extremity as a free flagellum. The myonema are grouped in pairs of four double myonema each, the total of sixteen being thus present on each side.

Fig. 14.—Motile and resting stages of the adult macrogametes and microgametocytes of spirillum. *a—c*, Macrogametes; *d—e*, microgametocytes.

The myonema are grouped in pairs, four double pairs of myonema, thus the total of sixteen are found on each side. Fig. 14*e* represents the corresponding stage of rest, as in *T. noctuæ*, here the nuclear increase takes place early for the formation of microgamates. The number of chromosomes of eight nuclei are hereby reduced from sixteen to eight in the same manner. The formation of the microgametes also (fig. 15) only deviates in minor details from those of halteridium. The complete microgametes are formed on the same plan, they represent small trypanosomes or spirilla. The maturity and fertilisation of the macrogametes (fig. 16) correspond, with the exception of the number of chromosomes. The formation of the ookinets closes the cycle of development of the *Spirillum ziemanni.*

It will be the task of further research in regard to this group of blood parasites to, first of all, confirm the history of development of the most nearly related forms of human beings and birds.

According to my researches, the development of *Spirillum anserina* in the blood of warm-blooded hosts takes place in the same manner as in *Trypanosoma noctuæ.* The first experimental step should be to discover the second host of relapsing fever. Unfortunately, I have not had the opportunity of doing so, as I lacked the material. I should, however, recommend that the experiments should be commenced with bugs, subsequently going on with other blood-sucking insects.

Spirilla in Yellow Fever?

My observations on the decrease in size of the spirilli by multiplication leads me to the conjecture that spirilla may likewise be the exciters of yellow fever. As in yellow fever the host is known, one should first of all minutely examine the malpighian tubes to find out if the infected mosquitoes do not exhibit deviations from the normal structure of the epithelial cells. Should parasites be here, so small as to no longer be recognisable as separate single individuals, it might be possible to bring them to agglutination (according to the analogy of the spirilla

of birds, one would first of all endeavour to allow the mosquitoes to fast after a big meal, &c.), and so make them optically perceptible. Perhaps also certain stages may be formed in the blood of the patient (the gametes) which, as in relapsing fever, are not recognisable as parasites. In any case I would like to give

FIG. 15.—Formation of the microgametes from the microgametocytes of *spirillum;* in this species the residual body mostly drops into two to three parts. On the right one observes the disintegrating ectoplasmatic sheath with the remains of the nutritive cells.

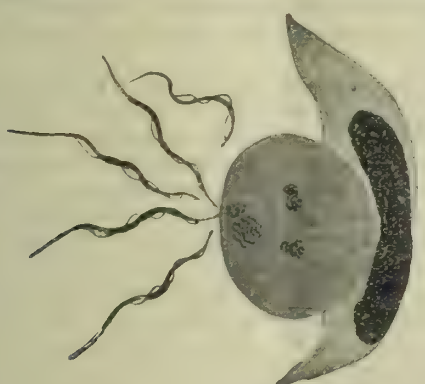

FIG. 16.—Fertilisation of the macrogametes of *spirillum* by the microgametes. One sees the female reduced double-nucleus (nucleus and blepharoplast each with eight chromosomes) in the ectoplasm. On the right are the two bodies of reduction. The disintegrating ectoplasmatic sheath, with the residue of the nutritive cells, lies to the right.

the stimulus for the research of yellow fever to be continued from the points of view yielded by my discoveries.[1]

This, of course, applies equally to the well-known trypanosomal diseases of mammals. Moreover, I find that the blood parasites here described present so many analogies to the malaria parasites that I shall recommence my studies of the latter, though I thought I had almost concluded my investigations on the subject. Later on, I shall have the opportunity of reporting the results of my investigations.

Relations of the Plasmodium to Trypanosomes and Spirilla.

I need only here mention that I am convinced that the genus *Plasmodium* at its genesis started from forms nearly related to the trypanosomes here described, and most nearly to the spirilla. I have hitherto found motile stages developed according to the plan of the trypanosoma in already two places on the cycle of development of the tertian parasites: the sporozoïtes and the merozoïtes. I hope to be able to demonstrate that the oocysts of plasmodium are constructed similarly to the balls of spirilla, which develop from the ookinets, that the sporozoïtes are not all alike, but that one can also distinguish females and indifferent ones, while the males have already perished in the oocysts. The females are no longer able to become trypanosomes. These are the forms in which I have described the gregarine-like movement and the penetration into the blood corpuscles. The indifferent actively moving forms represent real trypanosomes with all their peculiarities, such as blepharoplast undulating membrane, &c. These forms do not penetrate into blood corpuscles, but only attach themselves during the resting stages. I thus partly confirm the discoveries of Argutinski. He, as well as I, have generalised our one-sided discoveries over-hastily. The merozoïtes then assume the same three-fold course of development. I can also now find the trypanosoma-like stages; these are the forms which Friedrich Plehn has already correctly observed. In my work on the tertian parasite I could not indicate these discoveries: now I can even confirm them.

Moreover, I have already indicated that it also appears to me that the transformation of the macrogametes before the relapses appears to coincide with the parthenogenesis of the trypanosoma here described, and finally it has already been mentioned that I have confirmed the heredity of the malarial parasite in mosquitoes in one case. All the investigations, however, are far from their conclusion. The minuteness of the objects and the technicalities to be observed present great difficulties to the study of these organisms.

My phylogenetic conclusions, which I have hitherto formed from the comparative study of the various unicellular blood parasites, can only be completely formulated when I have communicated the results of my researches on *Caryolysus lacertæ*, and complete work of v. Prowazek on the *Herpetomonas muscæ-domesticæ* (the common house-fly) is published. Here I can only give a brief statement.

Like most of the more recent investigators, I trace all hæmosporidia from flagellata and come to the construction of an original scheme, which, at the present standpoint of our knowledge of the genus *Trypanoplasma*, stands nearest to that of Laveran and Mesnil. The spindle-shaped of my original hæmo-flagellata consists of ectoplasm and endoplasm; the former

[1] The *Myxococcidum stegomyiæ* described by Parker, Beyer and Pothier (in reports of the Yellow Fever, First Bull., No. 13, 1903), I consider to be a similar yeast fungus such as is found in the intestine and diverticuli of the œsophagus of all biting diptera. The illustration 15 shows the hyphæ of the fungus budding with great distinctness. I do not believe that these parasites have anything to do with yellow fever, but that the Stegomyiæ, like other Culicidæ have their specific commensal yeast fungi, the hitherto unknown stages of development of which these authors may have perhaps described.

serves for locomotion and the introduction of food, the latter for the absorption of the food. Each part has its central organ formed as a nucleus. Both nuclei are still of equal value. The locomotor nucleus produces the locomotor apparatus, in the form of two equal flagella with undulating membranes. According to this historical development, the locomotor apparatus (flagellum, undulating membrane myonema) originates from an equally-poled nuclear spindle, which originates from a daughter nucleus of the locomotor nucleus. In *Tryp. noctuæ* the spindle has become heteropole and one end has become transformed to a flagellum. I term this the phylogenetic anterior extremity; the posterior flagellum is thus retrograded; the creature swims with the anterior end forward, the agglutination of the forms and the attachment in the resting condition is accomplished by means of the anterior end. In *Spirillum noctuæ* the opposite pole has become retrograde, the posterior flagellum is developed, the creature swims with the phylogenetic posterior end first, agglutination and attachment in the resting stage now takes place by the phylogenetic anterior end without flagellum, and which in motion becomes the posterior one. An interesting intermediate form between the hypothetical original form and the spirillum is represented by a flagellate, which Poche discovered in a siphonophore, but did not describe correctly. According to the researches of Mr. Keysselitz,[1] made here in Rovigno, at my instigation, this form is of the type of a new genus, which he calls *Trypanophis*. The nucleus and blepharoplast are about equally developed, as in trypanoplasma, but one flagellum (the anterior one) is already reduced to a minute appendage, whereas the other, as a marginal support, is developed into a powerful undulating membrane. As the trypanosomes of mammals agglutinate with the aflagellate extremity they may perhaps be more nearly related to the spirilla. According to van Prozawek's researches, *Herpetomonas* has two amalgamated flagella at the anterior extremity. This form may perhaps have originated through flexion of the spindle of the flagellum and union of the equally developed pole.

The nomenclature of the genera (or higher groups?) of the flagellate blood-parasites, according to the zoological rules of nomenclature, can only follow when the types of the genera in question have been more minutely studied in their morphology and developmental history. The parasite of the frog, *Tryp. sanguines*, was set up by Gruby as a type of Trypanosomes in 1844.[2] First of all, it should be established with which pole this organism attaches itself; if it is the flagellated pole then I should be correct in placing the halteridium flagellates with the trypanosomes; it would be still more difficult to place the Ehrenberg *S. plicatilis*, which was discovered in 1838, with the type of *Spirillum*. So long as these facts are not determined the classification, on historical grounds, cannot be made. Each investigator can follow his own inclination as to which he will denominate *Spirillum* and which *Trypanosoma*; as to myself, I choose the term *Trypanosoma* for those forms which attach themselves by the flagellated pole, and I apply the term *Spirochæte* to those that attach themselves by the aflagellate extremity.

[1] This work will appear in *Arch. f. Protistenkunde*, vol. iii., No. 3.

[2] In *Ann. Sci. nat.*, III. Ser., V., I., p. 105.

Appendix.

After the completion of the MS. for this article, I had the opportunity of conversing about the pyroplasmosis of the ox and dog with State-surgeon H. Kossel and Staff-surgeon Dr. Weber in Berlin. These gentlemen called to mind a discovery made by Weber in 1900, on a cow suffering from hæmoglobinuria, but which, notwithstanding the attention directed to her, was never observed again. It was the question of blood-films taken from the vein of the ear of the cow about two hours before death. In view of the above-described investigations in halteridium, it appears of particular importance (to which no importance was attached then) that the films were prepared late in the afternoon; the cow, moreover, was in a stable to which only a little light could be admitted on the opening of the door. Weber reported as follows on the subject: "in addition to finding typical parasites of Texas fever in the blood of this cow, I succeeded in finding parasites of trypanosoma forms such as never had hitherto been observed in Texas fever, and which also were considerably smaller than the trypansoma described in Surra." Further research must teach us whether this was a question of a particular form of development of the parasites of Texas fever or of an incidental infection with a second parasite of another species.

As preparations of this case were still extant, it was possible to compare the morphology of this trypanosoma with those of the pyroplasma. Its size, the relative conditions of the plasma and nucleus, justified the hypothesis that it perhaps may be regarded as similar stages in the cycle of development of the pyroplasma as the trypanosoma of the halteridium in the cycle of development of the latter. Notwithstanding the age of the preparations, the nucleus and blepharoplast of the trypanosomal stages were still distinguishable; we have demonstrated the same dimorphism of the nuclear conditions in the stages of the pyroplasma of the dog which attaches itself to the blood corpuscles. Moreover, Kossel, in consequence of his studies of the latter, has gained the impression that the multiplication of the pyriform stages takes place through longitudinal fission. This discovery induced us to restain and examine old streak preparations from the contents of the intestines of ticks. The specimens had been prepared in Finland in 1899, and consisted of the intestinal contents of ticks which had fastened themselves to hæmoglobinuric oxen. In these streak preparations trypanosoma-like stages occurred similar to the above-mentioned preparations from the blood of the hæmoglobinuric cow.

In consequence, I think that I, and in conjunction with myself, Kessel and Weber, are justified in establishing the hypothesis that the development of the pyroplasma of the ox and the dog takes place in a similar manner to that of the halteridium. This chain of thought receives a further support by the news that Theiler had found spirochætæ and trypanosomes in

common red-water and in Rhodesian red-water fever. ("African Coast Fever," R. Koch.)

[Compare *Fortschritte der Veterinärhygiene*, 1903, No 4, and *Lignières in Arch. Parasit.*, vol. vii., p. 406.]

Correspondence.

PROPHYLAXIS OF MALARIA; ITS OPERATIONS AND P.M.O.'s.

TO THE EDITOR OF THE "JOURNAL OF TROPICAL MEDICINE."

THE remarks on the "Prophylaxis of Malaria and its Operations" through "cobwebs" woven by spiders, *et hoc genus omne*, in the *British Medical Journal* of the 15th inst., by Colonel M. D. O'Connell, R.A.M.C., clearly show the extreme value of close study in the field both of Natural history and the truculent foe. Experience gained in the administrative grades of the medical services by P.M.O.'s of commands, convinces one that the advocates of preventive or curative medicine in the East are "combatants," as far as the foes of mankind in the field of disease are concerned, and that they neither require their wit nor their sword sharpened against tribes on our frontier that weave "cobwebs" for catching "flies" or mosquitoes.

"E. H. A.," of natural history fame, who might have occupied a chair of Natural history, being the author of "The Tribes on my Frontier," and "Behind my Bungalow," in one of his chapters says, "candour is a jewel." Such a remark is worthy of a director of a great exhibition of knowledge and the fine art of acquiring the same.

In drawing our attention to such tribes as frogs, lizards, mosquitoes, flies, &c., he specially refers to the spider as the most intellectual and rapacious at the same time, for "they addict themselves to occult science and traverse the sky like a witch on a broomstick." Tropical studies certainly are having their palmy days, like palmists from Cairo, and it is left to us to freely believe in or accept the views of the Colonel, either *cum grano* or otherwise, with regard to "cobwebs" and their prophylaxis in malaria, in preference to mosquito-nets of linen or cotton which will wash. In the Colonel's mind at the time he wrote his little note on the subject, doubtless the story of "Bruce and the Spider" must certainly have presented itself as part of the virtue of "cobwebs," quite beside the views of E. H. A. with regard to the intellect of the spider and its love for the occult. Both have doubtless studied the creature and its wonderful powers of construction of cobwebs, and of rapid destruction of the enemies of mankind, viz., flies and mosquitoes, particularly the "blood-thirsty Anopheles." It would be straining at a gnat and swallowing a camel if we did not bestow that praise which both the Colonel and "E. H. A." do upon the weaving and rapacity of the spider as worthy of grave consideration now that the prophylaxis of malaria is before the public, and we have to consider which is the least costly (from the point of view of our finances in India and of the tropics generally), and the easiest to accomplish through the art of preventive and curative medicine as taught in our Universities.

I have no desire to deal with the subject in any other manner than with that freedom of opinion which characterises all British journalism, and the open-air treatment which is popular in preventive medicine. I trust therefore, I may be allowed to subscribe my name instead of a *non-de-plume*.

G. H. FINK,
Major I.M.S. (*Retired.*)

12, *Fairfax Road,*
Bedford Park, W.
19*th October*, 1904.

Review.

MEDICAL HINTS AND NOTES ON EGYPT AS A WINTER RESORT. By Arthur J. M. Bentley, M.D. Messrs. Bale, Sons and Danielsson, 83-91, Great Titchfield Street, London, W. Post free 1s. Pp. 42. Sixth Edition, twenty-first thousand.

Dr. Bentley's book has run through so many editions that it is needless to say more than that it has served as a guide and useful reference to many visitors to Egypt, and especially to those who go there on account of their health. Dr. Bentley especially advocates the claims of Helouan, and gives a short account of its sulphur baths, which maintain their efficacy for rheumatic and gouty ailments and many forms of cutaneous and nervous diseases. The photographs in the book bring home to British folk the contrast between the clear air and the bright skies of Egypt and the grey foggy atmosphere which prevails throughout the greater part of Britain during the winter months. Egypt will for ever prove attractive to the historian, the antiquarian, and the student of religious beliefs and creeds; and, until some terrestrial cataclysm despoils it of its distinctive meteorological features, it will continue to increase in favour as a resort in winter with those dwelling in the cold and stormy latitudes of Northern Europe.

Notes and News.

AWARDS OF THE COMMITTEE OF THE ST. LOUIS INTERNATIONAL EXPOSITION TC THE WELLCOME PHYSIOLOGICAL AND CHEMICAL RESEARCH LABORATORIES, LONDON.—(1) One grand prize and one gold medal for bacteriological research and preparations, and for educational work. (2) A grand prize and three gold medals, in recognition of the importance and educational value of the chemical and pharmacognostical researches conducted in these laboratories under the direction of Dr. Frederick B. Power. (3) Three grand prizes and three gold medals have been conferred for the scientific excellence of Messrs. Burroughs, Wellcome and Co's exhibit of "Wellcome" brand chemicals, "Tabloid" and other pharmaceutical products, and "Tabloid" medical equipments.

THE OATH—STRANGE CUSTOMS FOLLOWED BY CHINESE, HINDOOS, PERSIANS AND OTHER PEOPLES.—Chinese witnesses must be sworn in several ways if they are to be bound to tell the truth. In some cases the witness breaks a plate and assents to the imprecations that his soul may be shattered in the same way if he strays from the paths of veracity.

With a large section of the Chinese, the formula is for the person administering the oath to light a match or candle and, blowing it out, tell the witness that thus will his soul be extinguished if he does not speak the truth, to which he assents by giving a short nod. Some tribes living on the Thibetan tableland can only be sworn in court by cutting off the head of a live gamecock. The Hindoo law says:—

"Let a Judge swear a Brahmin by his veracity; a soldier by his horses, his elephants, or his arms; an agriculturist by his cows, his grain or his money, and a sounder by all his crimes."

Quakers, in all civil cases, are allowed to give their evidence in affirmation, as also are the Moravians and Separatists.

A Galla of Abyssinia sits down over a pit covered with a hide, imprecating that he may fall into a pit if he breaks his word.

A Brazilian savage, to confirm his statement, raises his hand over his head and thrusts it into his hair or touches the point of his weapons.

Among the Aracans, an Asiatic tribe, the witness swearing to speak the truth takes in his hand a musket, a sword, a spear, a tiger's tusk, a crocodile's tooth or a stone celt. The hill tribes of India swear by a tiger's skin, and the Ostraks by a bear's head.

The sacred oath in Persia is "by the holy grave," that is, the tomb of Shad Besa 'de, who is buried in Cashmere.

Members of the Kirk of Scotland are sworn by lifting the hand while the Book is laid open before them; Jews are sworn on the Pentateuch with their hats on: Mohammedans by placing the right hand flat on the Koran and the left on the forehead, and then bringing down the forehead to the book, and finally gazing a while at the book. The highest oath of the man who dwells by the Ganges, in India, is taken on the water of that river.—*Exchange.*—*Pacific Medical Journal*, September, 1904.

The Circumcision of Women.—In the *Caledonian Medical Journal* of July, 1904, there is an article on the Circumcision of Women. The author's name is not stated, but in giving extracts from Somnini's travels it is recorded that the inhabitants of Egypt are circumcised, men as well as women. The custom of circumcising women was practised by the ancient Egyptians, but it is also followed at the present day, and has been mentioned by several modern writers. Somnini witnessed the circumcision of an Egyptian Mahommedan girl, and states that what was removed was a fleshy excrescence hanging from the os pubis, immediately above the labia: neither the nymphæ nor the clitoris were touched. The operator told Somnini that, were this excrescence not removed when the girl was quite young, at the age of 25 it would be four inches in length. In other parts of Africa circumcision would seem to be an established custom amongst certain tribes. Both Valliant and Barron mention a similar growth necessitating removal, and the preternatural apron of the Hottentot females described by these writers would seem analogous to the excrescences on the genital organs of the Egyptian females. In Abyssinia it is stated also that female circumcision is practised, but the precise nature of the ordeal it is difficult to obtain an exact account of. It would be interesting to obtain further information concerning practices of the kind if they exist amongst other races; for should the necessity for such a custom be established it would go a long way towards the proof of the existence of different species of human beings. May we hope for information in this interesting teleological point from some of the numerous medical men practising amongst remote native races?

Colonial Reports.

Cape of Good Hope.

Report of the Medical Officer of Health for the Colony on the public health, and on the Government and state-aided Hospitals of the Colony, together with the Annual Health Reports of District Surgeons and Local Authorities for the year 1903. Cape Town, 1904, pp. 309.—The official report of the medical officer of health for Cape Colony, Dr. A. John Gregory, for the year 1903 is welcome, if for no other reason than that we have seen no record of the Public Health of this part of His Majesty's dominions since 1896. Dr. Gregory regrets that this should have been so, but it is apparent that considering the unsettled state of the Colony for several years it was inevitable. Moreover, no census of the population had been taken between 1891 and 1904; but the report before us was issued before the 1904 census was obtainable. As Dr. Gregory remarks, the public health department of Cape Colony is old-fashioned, and until the government places the department on a footing with, at any rate, other South African Colonies, the Health Officers will continue to be heavily handicapped in their work. The sanitary state of many of the towns and villages in Cape Colony is unsatisfactory, and in some instances disgraceful. The report of Dr. R. Stevenson, the district surgeon at Prince Albert, is scarcely to be credited. In Prince Albert, in which over a 1,000 Europeans reside, besides natives, Dr. Stevenson says: "The water supply, although pure at its origin, is in its passage through the village so polluted by animals defæcating and micturating in the stream, as to be unfit for human consumption; and to add to the contamination, a dead decomposed ox, and the body of a coloured boy were taken out of the drinking water near the village. There is no system of sewerage or drainage, and the disposal of the night soil is unsatisfactory. Dwellings are overcrowded, and the stench arising from animal kraals is in summer unbearable." It is evident there is much to do in Cape Colony in regard to muncipal sanitation.

Prevalent Diseases.

Tuberculosis would seem to be the greatest scourge in Cape Colony. The marked increase of this disease during the past twenty years is ascribed to phthisical patients coming to South Africa in the hope of deriving benefit from the climate. It is the case of a good name bringing calamity, for owing to the want of regulated sanatoria, the tubercular patients have been allowed to dwell amongst the community and infect them. The native population has been seriously contaminated by tuberculosis, and when one considers the squalor in which the natives live, the prospect of speedy eradication of the disease seems hopeless.

Small-pox prevailed in many towns and districts

during 1903; it is satisfactory, however, to note that the disease was of a mild type. In some districts the disease is termed "amaas" or "kaffir-pox," and so mild are its symptoms that many medical men have doubts as to the exact nature of the disease. Dr. Turner reported upon kaffir-pox in 1895, and came to the conclusion that the disease was really small-pox, but modified in some unascertained way.

Enteric Fever prevailed in many districts, and Europeans seemed to suffer more than natives; a statement, however, which is attributable rather to want of notification than to immunity amongst the coloured peoples.

Diphtheria occurred in epidemic form in several towns and villages. Anti-diphtheritic serum from the Lister Institute, London, proved most efficacious.

Plague cases occurred at Delagoa Bay in February, 1899; in April, 1899, at Mochadi near Lorenzo Marquez; at Durban in May, 1900; in Table Bay on March 5th, 1900; at Izeli, near King William's Town, October 24th, 1900; but it was not until February 2nd, 1901, that Cape Town became infected. During 1901 there occurred 766 cases of plague in and near Cape Town, of these 371 died. The cases and deaths from plague were distributed as follows: Europeans, cases 207, deaths 69; coloured, cases 380, deaths 216; Natives, cases 157, deaths 70; Indians, cases 21, deaths 16; Chinese 1, deaths 0. The last case of plague in Cape Town occurred in January 2nd 1902, and the last infected rat on January 19th, 1902. Plague occurred at Mafeking, Imvani, Port Elizabeth, Uitenhage, Mossel Bay, Ladysmith, Graaf-Reinet, East London, King William's Town, Kei Road, Burghersdorp, Queenstown, Grahamstown, Knysna, Seymour, and Lady Grey Bridge in the Paarl District.

Leprosy continues to be a troublesome question at the Cape; a popular cry was got up about the iniquity of sending lepers to Robben Island, and many philanthropic persons sought to transfer the leper asylum from the island to the mainland. There is no doubt that the fact that on Robben Island there is a convict establishment and a lunatic asylum tends to prejudice lepers and their friends against Robben Island as a leper retreat. It is more easy, however, to find another site for a prison or a lunatic asylum on the mainland than a fresh site for a leper retreat, and it would seem wiser to bring the convicts and lunatics to the mainland and leave the lepers where they are. The newspapers at the Cape tried lately to prejudice the public against the segregation of lepers at Robben Island by declaring that many persons were kept there for many years before the medical men found out that they had got leprosy. There is, however, another explanation of the matter, namely, that the disappearance of all signs and symptoms is not an uncommon feature of this (incurable?) disease. Under hygienic conditions and with good food, lepers not infrequently seem to get rid of the disease, if only for a time it may be, yet sufficiently completely to justify popular belief that they never had the disease. Anyone who has experience of leprosy knows of cases of apparent cure or it may be permanent cure.

The reports from district surgeons, in all some eighty-four in number, contain a wealth of information concerning the sanitary conditions and the diseases which prevail in Cape Colony.

Dr. George W. Robertson, the bacteriologist to the health department, reports upon the futility of trying to prevent rats passing to and fro to ships by means of tar and discs on the ropes and cables making a vessel fast to the shore, and of the efficiency of the Clayton gas as a germicide and as a rat destroyer on board ships.

The report is a valuable contribution to public health work generally, and a credit to the medical officer of health in Cape Colony and of those associated with him.

Plague in Natal, 1902-03.

Report by Ernest Hill, M.R.C.S., L.R.C.P., D.P.H., Health Officer for the Colony of Natal. London, Cassell and Co., 1904, pp. 192. Illustrated by a map, charts and microphotographs.—In the introductory remarks Mr. Ernest Hill states that the first case of plague in Natal was discovered in Durban, on December 4th, 1902. Between that date and August 15th, 1903, when the last case of plague was seen, 221 persons contracted the disease, of which number 162 died, giving a case mortality of 73 per cent.; of this number 201 cases with 145 deaths occurred in Durban alone. Dr. P. Murison, the Medical Officer of Health for Durban, and Dr. H. E. Fernandez, the Port Health Officer, devised an excellent system for the reporting of suspicious cases of illness, for the segregation of contacts, and for the conveyance and treatment of the plague patients. Previous to the discovery of plague in human beings in December, 1902, rats were found to be plague-infected, but only twenty-four hours before the first case declared itself in man. Rat infection was found to prevail during the first week in December to a wide and virulent extent, and there seems little doubt that the rat plague preceded human infection. The measures taken for the limitation of plague were: (1) The destruction of vermin—in this connection Danysz's "rat virus" proved inefficacious; (2) disinfection—all premises in which cases of plague occurred were treated with chemical disinfectants, and all clothing, &c., exposed to saturated steam in a portable Thresh disinfector; (3) isolation of sick; (4) scavenging was carefully done; (5) evacuation of injected areas; (6) preventive inoculation—Haffkine's serum was not resorted to (although the value of the method is highly spoken of) owing to the fact that the outbreak was more of a sporadic than of an epidemic nature in Durban; (7) segregation of contacts—this was not systematically resorted to for several reasons, and apparently without detriment to the public health.

A critical analysis of 124 cases of plague treated in the Durban hospital is contributed to the report from information supplied by Mr. H. Cockerton and Mr. F. J. Allen, who were successively in medical charge.

Dr. Fernandez drew up an excellent map and numerous charts, both of which add to the value of the report.

In Part II. Mr. Watkins-Pitchford, F.R.C.V.S., Government bacteriologist, deals with the experimental work connected with the bacteriology of plague. In this department Dr. Haydon's services

proved of marked benefit. Cultural observations showed that the growth of the bacillus appears to be almost inhibited in carbonic acid gas, that bouillon shows no growth after a month, and that the reaction of the organism is distinctly alkaline, being marked in bouillon for eight months or more. In its morphology the plague bacillus shows that "considerable modification in contour and differential staining properties appear to take place *in corpore* with advancing age of the bacillus and advent of putrefactive changes." The size of the organism would seem to vary according as it is taken from the spleen or from buboes in human beings, being slightly shorter when taken from the latter; the average size, however, of the *Bacillus pestis* in man and lower animals averages about 1·5 microns in length by ·8 microns in breadth.

In connection with testing the vitality, some interesting experiments were made. A number of plague-infected rats were placed in carefully isolated boxes. When these rats died thirty days were allowed to elapse without the boxes being touched; at the end of thirty days healthy (plague free) rats were put into the boxes; these caught plague and died. The boxes were now left vacant for two months, healthy rats again put into them with the result that none of the rats caught the disease. It is reasonably assumed therefore that the plague organism dies out in from four to eight weeks in infected premises, grain, straw, &c. The diagnosis of plague by clinical methods and by microscopic examination of tissues and fluids is not conclusive evidence of the presence of plague. Several organisms attacking animals, such as the *Bacillus cholera gallinarum* in birds, are with difficulty distinguishable from the plague bacillus, and epidemics prevailing amongst domestic animals when plague is prevalent amongst human beings, are apt to be, even after microscopic examination, mistaken for plague. Cultural tests and estimates of the virulency of the bacillus are necessary before one can definitely pronounce a suspected organism to be really the plague bacillus.

There is much to learn clinically and pathologically from Mr. Hill's report, and every one concerned with plague, its epidemiology, and its prophylaxis, ought to study his report most carefully.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Beri-beri in St. Helena.

Mosse, C. G. D. Report on Outbreak of Beri-beri amongst Prisoners of War at St. Helena. *Journal Royal Army Medical Corps*, 1904, September.—Amongst the Boer prisoners in St. Helena, 91 cases of beri-beri occurred. Colonel Mosse is inclined to believe that the germ of the disease was introduced by the Boers themselves. The reason for the spread of the disease amongst the Boers and not amongst the British troops guarding them is that the Boers were much confined to camp, that they suffered from mental and physical depression, and that in their persons and in their environment they were less cleanly than the British soldiers. Ten of the 91 men attacked died. In discussing the etiology of the disease Colonel Mosse considers that food has nothing to do with it otherwise the soldiers on guard who were fed on a similar diet to the prisoners would also have suffered, whereas they remained altogether free of the disease. Rice formed no part of the diet as a rule.

Dysentery.

Taylor-Jones, L. Dysentery. A Report of Several Cases in which *Bacillus dysenteriæ* (Shiga) was found in Washington, D.C. *Journal American Medical Association*, 1904, July 2. — The (alkaline) bacillus of Shiga and the (acid) bacillus of Flexner have been found by Taylor-Jones in cases of dysentery in both children and adults. It would seem, therefore, that Washington, D.C., must be included in the geographical distribution of districts in which these bacilli are found.

On some Mammals Collected by Captain H. N. Dunn, R.A.M.C., in the Soudan.

In the *Journal of the Royal Army Medical Corps*, for August, 1904, an account of some mammals collected by Captain Dunn in the Soudan is given by Mr. Oldfield Thomas, F.R.S.

The following are the scientific names of the more important:—

(1) *Rousettus stramineus* (Geoff.).
(2) *Hipposiderus caffer* (Sund.).
(3) *Megaderma frons* (Geoff.).
(4) *Taphozous perforatus* (Geoff.).
(5) *Canis anthus soudanicus*.
(6) *Vulpes vulpes ægyptiaca* (Sonn.).
(7) *Vulpes pallida* (Cretzschm).
(8) *Ictonyx frenata* (Sund.).
(9) *Dipodillus stigmonyx* (Hengl.).
(10) *Gerbillus agag*.
(11) *Arvicanthis dunni*.
(12) *Acomys witherbyi* (de Wint).
(13) *Leggada tenella*.
(14) *Jaculus gordoni*.
(15) *Lepus æthiopicus* (H. and E.).
(16) *Procavia ruficeps* (H. and E.).
(17) *Oryx algazel dammah* (Cretzschm).
(18) *Gazella rubicollis* (H. and E.).
(19) *Gazella rubifrons* (Gray).

Of the collection, no fewer than five of the mammals require new names, thus showing how much remains to be done in the field of zoology in many parts of the world.

Plague.

Prevalence of the Disease.

India.—During the weeks ending September 24th, October 1st and 8th, the deaths from plague numbered 11,866, 13,633, and 16,491 respectively.

South Africa.—At Port Elizabeth during the weeks ending September 24th, October 1st and 8th, fresh cases 2, 1 and 1; deaths 1, 1 and 0.

Mauritius.—During the weeks ending October 13th, 20th, and 27th fresh cases 45, 26, and 24; deaths 36, 14, and 18.

Tabanus Horse-flies in Rangoon.

Specimens of horse-flies sent by Captain H. S. Anderson, R.A.M.C., to Mr. E. E. Austen of the British Museum, proved to belong to the family *Tabanidæ*, in all probability *Tabanus purtitus*, Walk., originally described from Singapore. Austen remarks that flies belonging to the Genus *Glossina* are confined to Africa, but the *Tabanus* has been proved by Captain Leonard Rogers to be capable of transmitting *Trypanosoma evansi* to rabbits and dogs. It is possible the same family of flies may also be the means of spreading cattle disease in Burmah.

Yaws in the Philippines.

Woolley P. G. *American Medicine*, August 6, 1904.—In Northern Luzon in the Philippines, Woolley observed that the natives suffered from sluggish ulcers on the legs, neck, and body, associated with an anæmic state. He considers that the ulcers were due to yaws, but at the same time remarks that yaws do not ulcerate as a rule. Until the evidence is corroborated, the statement that Yaws occur in the Philippines must be received with caution.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

A Factor in the Anæmia of Ankylostomiasis.

Loeb and Smith. (Proceedings of the Pathological Society of Philadelphia, June, 1904.)—The authors state that the excessive anæmia met with in patients infected with ankylostomes, even when the intestinal parasites are few in number, may be due to: (1) a substance secreted at the anterior extremity of the ankylostome, having the power of preventing coagulation of the blood, and thereby allowing a prolonged hæmorrhage after puncture; and (2) one worm often makes a series of punctures, so that a quantity of blood may be lost from the bite of a small number of ankylostomes.

Erythromelalgia Tropica.

Gerrard, P. N. Burning foot, or Erythromelalgia Tropica. *Dublin Medical Journal*, September 1, 1904.—In the Malay peninsula Gerrard met with several cases of burning feet amongst natives, who work barefooted on roads and plantations. At first the sensation is that of pins and needles in the soles, followed by an acute burning sensation, preventing walking and sleep. Malarial pigment blocking the vascular supply of the nerves in the area affected is suggested as a cause. Relief was obtained by immersing the feet in hot salt and water, but no remedial measure has proved of any curative value.

Hæmoglobinuric Fever.

Hearsey, H. The Treatment of Hæmoglobinuric Fever. *British Medical Journal*, March 5, 1904.—Hearsey recommends treating black-water fever with a mixture of sodium bicarbonate grs. x., and liquor hydrargyri perchloridi minims xxx. given every two hours, for the first twenty-four hours, and afterwards every three hours, until the urine is free from hæmoglobin. Brandy as a stimulant and liquid nourishment are advised. Hearsey treated eighteen cases by this method without a death.

Hay Fever.

Treatment. Saturated solution of quinine sulphate in sterilised water as a nasal spray, and an ointment to the inside of the nose of 30 grains quinine to 100 petrolatum.

Kala-azar and Delhi Boil.

Leishman W. B. Notes upon the Further Investigation of the Parasites of Kala-azar and Delhi Boil. *Journal Royal Army Medical Corps*, September, 1904.—In these interesting notes Leishman mentions, in connection with the infection by Leishman-Donovan bodies, the following points: (1) Ulceration of the intestines, especially the colon, is a frequent concomitant of the affection; and the diarrhœa and dysentery met with in the disease are specifically due to the presence of the parasite. (2) A marked increase in the percentage of the large mononuclear leucocytes in the peripheral blood. (3) The local œdemas may be due to lymphatic obstruction. (4) The parasites lie in the protoplasm of the large mononuclear cells (macrophages). (5) So-called "Dum Dum Fever" and Kala-azar are apparently identical diseases. (6) There seems little doubt the Leishman-Donovan body is a stage in the development of the trypanosoma. (7) The search for the alternative host should be the immediate object of investigators. (8) Seeing the trypanosoma is not met with in the peripheral blood, some medium other than blood-sucking parasites would appear to be the probable hosts. (9) As the intestinal ulcers have been found to harbour the parasites, it is possible that the medium of exit is by way of the fæces, although the parasites have never been found in the fæces. (10) As Rogers, in cultivating the parasites, found they thrive well at a low temperature, it is possible a cold-blooded animal might serve as a host. It would seem that fish might be a possible host, and Bentley in Assam has found in Kala-azar districts that fish are infested with trypanosomes. (11) The identity of the parasites found in Delhi boil with the Leishman-Donovan body, although, possibly true, is not yet fully established. Major Leishman finishes his suggestive article by pointing out the necessity of some other means of examining for Leishman-Donovan bodies than by the rather dangerous method of splenic puncture.

Leprosy.

Glueck, L., and Wochinski, R. Lepra of the Ovaries. *Archiv. Dermat. f. und Syphil.*, vol. lxvii., p. 39.—The authors report that in the ovaries of leprous women they found *post-mortem* signs of chronic interstitial inflammation in the form of sclerosis of tissues, and occasional atrophy or hyperplasia of the organs.

Sen, H. C. Hydnocarpus oil in Diabetes, Rheumatism, Chronic Skin Diseases and Leprosy. The

Calcutta Practitioner, April, 1904. Dr. Sen recommends the oil obtained from the seeds of *Hydnocarpus Wightiana* (Syn. *H. Inebriens*) natural order *Bixinæ*, in doses of from 15 to 120 minims in the treatment of leprosy. It is an old Hindoo remedy, and has been extensively used in France.

THOMPSON, J. ASHBURTON. Epidemiology of Leprosy, A Plea for Accuracy. *Australasian Medical Gazette*, August 20, 1904.—The generally-accepted belief that leprosy was introduced into Australia by Chinese has, according to Dr. Thompson, not been proved. In New South Wales leprosy occurred in whites before cases of the disease were reported amongst coloured people. In the Hawaiian islands, although leprosy became rife after the Chinese found their way thither, it is not proven that the disease was originated by them in these islands.

Malaria.

CHATTERJI, G. C. Some Researches on the Malaria Parasite and its Intermediary Host—the *Anopheles*. *Calcutta Practitioner*, March, 1904. — In these articles some interesting speculations founded upon laboratory research are made. The description of *Anopheles* found in and about Calcutta should prove useful to medical men in their investigations in the neighbourhood of Calcutta.

HARTSOOCK, F. M. The Dysentery of the Tropics. *New York Medical Journal*, July 16, 1904.—Dr. Hartsoock, Surgeon, United States Army, from experience gained in Puerto Rica, in 1898-99, classifies cases of dysentery as follows: (1) Catarrhal dysentery, due probably to the natural hyperæmic condition of the intestinal mucosa of the European in the tropics, plus some chance irritation; (2) Amœbic dysentery is always chronic, attended by improvement or relapse, and ends in liver abscess or late recovery. The *Amœba dysentericæ* is usually present in the mucus of the stools. Hartsoock is, however, careful to point out that the *Amœba dysenteriæ* is present in the mucus of stools when no dysentery is, or has been, present. He is of opinion that amœbic dysentery is always the forerunner of sprue; (3) specific dysentery, or acute bacillary dysentery, is an infectious disease, the lesions showing in the large and lower part of the small intestine and mesenteric glands. A bacillus is constantly found which is related in its cultural and physiological properties to the *Bacillus typhosus*, which agglutinates with the blood of patients suffering from this form of dysentery.

JACKSON, T. W. Concerning the Invasion Period of the Malignant (Æstivo-Autumnal) Tertian Malarial Parasite. *American Medicine*, July 9, 1904.—Jackson, from experience gained in the Philippines, concludes that the period of incubation in æstivo-autumnal malarial infection is ten or eleven days.

STEELE, H. M. An Irregular Manifestation of Malaria in an Infant. *Yale Medical Journal, Medical Record*, March 19th, 1904.—Steele treated an infant 19 months of age for malaria. His diagnosis rested on an examination of the blood.

Hypodermic Injection of Quinine.

DARKER, G. F. *British Medical Journal*, 1904, June 25.—Quinine sulphate (15 to 20 grains) mixed with one and a half times its own weight of vaseline and injected hypodermically, is recommended by Darker as a suitable means of lessening the malarial index amongst natives of West Africa. The injection should be made in the left flank. The lump caused by the injection takes about three months to disappear. Children on whom this injection has been tried show no malarial parasites in their blood. The test of the efficacy of this treatment is rather marred by the fact that quinine was given by the mouth and intramuscularly at the same time.

When to give Quinine.

BASSENGE. Therapy and Prophylaxis of Chronic Malaria. *Deutsche Medicinische Wochenschrift*, 1904, June 16. — In two cases of malaria contracted in the tropics, Bassenge found quinine given for almost twelve months, 7 grains every fourth day, sufficient to control the fever. It was not until a blood examination showed the parasite to be of the quartan type and the exhibition of quinine at the proper moment that the fever was overcome.

Malaria—Euquinine as a Prophylactic.

KUELZ. Malaria and its Prophylaxis through Quinine in Little Popo, Africa. *Archiv. für Tropen-Hygiene*, No. 8, 1903.—Dr. Kuelz states that euquinine is a thoroughly reliable drug in the treatment of malaria, and that as a prophylactic it is efficacious when given in doses of 15 grs. every eighth or ninth day.

Mosquito Bites.

SCHILL. Remedy for Mosquito Bites. *Deutsche Medicinische Wochenschrift*, vol. xxx., No. 35.—By moistening sodium bicarbonate so as to form a paste, and applying over a mosquito bite, the sting of the bite is allayed. To drive mosquitoes away Schill swabs the exposed part with a 2 per cent. solution of thymol.

Mosquitoes—Protection from.

ROSENBERG, S. A Means of Protection against Mosquito Bites. *Munich. Med. Woch.*, No. 27, July 5, 1904.—Indicates a means for protection against mosquito bites in malarious countries. A maceration of quassia bark is allowed to remain in water for several hours. The exposed parts of the body are then washed with the concoction and left to dry without wiping.

Plague—West Australia.

ANDERSON, T. L. Notes on Bubonic Plague. *Australasian Medical Gazette*, August 20, 1904.—Observations on forty-three cases of plague seen by Dr. Anderson in West Australia, enable him to say: (1) Incubation period in the bubonic type of the disease is from two to three days; (2) inguinal buboes occurred in 81 per cent. of the cases, axillary in 9 per cent. and cervical in 9 per cent.; (3) a rash, consisting of small dark red spots on the skin which could be just felt by the finger, and not wholly disappearing on pressure, was observed on the fourth day in 25 per cent. of the cases. In West Australia 4,000 persons were inoculated with Haffkine's prophylactic between 1900 and 1903, without any untoward results.

Plague—Kashmir.

Mitra, A. A Report on the Outbreak of Plague in Kashmir, November 19, 1903, to July 31, 1904.—Plague appeared in Kashmir on November 19th, 1903, in the person of a man from up-country, who was found at the gate of the State Hospital in Srinagar. The disease was distinctly traceable to the persons who came in contact with this man, and to those who helped at the burial of his corpse. The first case was one of the bubonic, the second of the pneumonic type. In Srinagar no rats or other animals were found infected with plague.

Sleeping Sickness.

Hodges, A. D. P. Sleeping Sickness: Abstract from *Lancet*, 1904, July 30, p. 290.—Sleeping sickness has been known in West Africa since 1803. Our knowledge of the origin of the Uganda epidemic is very vague. Though many natives date its beginning from 1896 it did not become known to Europeans until 1900. The fact that the natives of Uganda were not acquainted with it is no proof that former epidemics have not occurred.

Sleeping sickness attacks all ages and both sexes, but infants usually escape, and old people, who are not themselves numerous among African natives, are perhaps less liable.

Clinically, the course of sleeping sickness has been, for convenience, divided into three stages, but their limits are very ill-defined. They are (1) the early stage, (2) the pronounced stage, and (3) the lethargic or somnolent stage. There is also sometimes an intermediate stage of nerve crisis, excitement, or exhilaration, which occurs usually at the beginning of the second stage and is really a part of it. Probably the earliest subjective symptom is a chronic persistent or intermittent headache with lassitude, and this may be accompanied or replaced by vague pains in the back, chest, or "all over."

Pyrexia.—A conjunction of chronic headache or pain with lassitude, tongue tremor, and pruritus, and glandular enlargement, is always very suspicious in a person who has visited an epidemic area, and if there is also evidence of change in disposition, or if there is recurrent pyrexia, the diagnosis becomes almost certain.

The second or pronounced stage is not infrequently ushered in by nervous crises, such as epileptiform fits, attacks of mania, melancholia, or dementia, or by a state of exhilaration, during which the patient has very much the appearance of being under the influence of alcohol. In the third stage there is a tendency to sleep at all hours, and the patients pass surely but gradually into the last or lethargic stage, which has been so graphically described, and in which they eventually die, sometimes suddenly but nearly always very slowly, so that the vital functions seem to dwindle away gradually.

The chief pathological evidence of general infection is the constant enlargement of lymphatic glands in all, or nearly all, the groups, both superficial and deep, while a chronic encephalo-meningitis presents itself as in all probability the fatal lesion. Besides the naked-eye evidences of this lesion there are the microscopic changes, described first by Mott and confirmed by other observers.

The two organisms which are at present being studied in connection with sleeping sickness are the diplostreptococcus and the trypanosome. The trypanosome occurs not only in the blood but in the cerebro-spinal fluid in sleeping sickness, which thus differs from the condition at present known as trypanosomiasis, in which the organism is found in the blood only.[1] The chief carrier of the trypanosome is *Glossina palpalis*, a tsetse-fly, the distribution of which in the Uganda Protectorate corresponds roughly with the epidemic area. Whether this correspondence exists in other epidemic areas is not yet worked out.

Inoculation experiments by Bruce have produced trypanosomiasis in monkeys (*Cercopithecus*), some of which have died, always after a period of months in a condition clinically resembling sleeping sickness, and the macroscopic appearances at the necropsies have appeared to be identical with those seen in sleeping sickness.

How the diplostreptococcus finds entrance to the human body is not at present known. The Portuguese Commission found it in 52 per cent. of the cerebro-spinal fluids which they examined, and in many of the negative cases it was present in other organs. It is found in large numbers in the microscopic brain lesions. It has not produced in animals, by inoculation, symptoms resembling sleeping sickness, but causes death by acute septicæmia. Its presence has not so far been recorded in those animals which have died with symptoms of sleeping sickness after inoculation with trypanosomes. It is considered, however, by some of the most competent observers engaged in the matter to be in some way intimately associated with the disease, with the microscopic brain changes, and with the fatal ending.

As to whether trypanosomiasis must necessarily and inevitably pass into sleeping sickness, there is some slight reason to believe and to hope not; the trypanosome may in certain circumstances die out in the blood.

The reasons why there is such a marked relative immunity for Europeans are probably (1) their manner of clothing leaves exposed a less area of skin than that of the natives, and only the more sensitive parts, the hands and the face; (2) they do not live, or lie asleep in the daytime, nor do they usually work, in jungle or forest. They are less liable to get bitten, and when bitten they are more likely to brush off the fly before inoculation has been completed, for the insertion of the proboscis of the fly is easily felt, like the prick of a needle.

Splenectomy.

Stirling, R. A. Two cases of Splenectomy. *Intercolonial Medical Journal of Australasia*, July 20, 1904.—Stirling recommends splenectomy in malarial spleen, splenic pseudo-leukemia, splenic leukemia,

[1] Since this paper was written the trypanosome has been described as occurring more plentifully in the lymph glands than elsewhere, both in the trypanosomiasis and in sleeping sickness, and one of the cases of trypanosomiasis under observation is thought to be developing some signs of sleeping sickness. Greig and Gray, *Lancet*, June 4th, 1904, p. 1570.

Banti's disease, wandering spleen, and in abscess, rupture, sarcoma and hydatids of spleen. Two cases reported by Stirling made a good recovery after the operation.

Stools, Clinical Examination of.

Kozicz Kowsky, E. v. Beitrage zur methodik der Klinischen Stahluntersuchung. *Deutsche Medicinische Wochenschrift*, vol. xxx., No. 32.—(1) To determine the reaction of the fæces, immerse a small quantity of the stool in a 10 per cent. aqueous litmus tincture, by this method the alkaline, neutral or acid reaction is determined; (2) to extract fat from the fæces, evaporate over a water bath and extract with ether; (3) to extract urobilin, rub up the fæces with alcohol and filter; (4) to test for blood in the stool after the removal of fat; digest 5 grammes of fæces in 5 grammes of glacial acetic acid and 5 or 10 cc. of ether for a minute or two, over the mixture (filtered or unfiltered) is poured by a graduated pipette 1 to 5 cc. of ozonised turpentine, and on this 5 cc. of a fresh 2 to 3 per cent. solution of aloin. A method of determining the amount of albumen in the stool is also given by Kozicz Kowsky which should prove of great value in many of the more wasting diseases associated with intestinal disturbance.

Tropical Ulcer—Spirillum Present.

Smith, F., and Peill, S. G. A Spirillum in an Acute Tropical Ulcer at Sierra Leone. *Journal Royal Army Medical Corps*, September, 1904.—In an extensive ulcer of the leg of a native boy of 7, Smith and Peill found spirilla (with other organisms) in large numbers. Although the ulcer was scraped, burned with nitric acid, and dressed with carbolic lotion, the spirilla did not disappear, and it was only after fourteen days' antiseptic dressing that the wound appeared healthy and the spirilla disappeared. No spirilla were found in the mouth, in the peripheral blood, nor in the blood drawn off from the spleen. Attempts to cultivate the spirilla and to inoculate animals therewith failed.

Trypanosomiasis.

Günther. A Case of Trypanosome Disease in Man. *Munchener Medizinische Wochenschrift*, June 14, 1904.—A patient of Günther's, who had been in South Africa, suffered from irregular attacks of fever, diminished hæmoglobin, temporary local œdema of various parts of the body, a skin affection, enlarged liver and spleen, tachycardia, dyspnœa, and a relative increase of uninuclear leucocytes. In the peripheral blood trypanosomes were always found during attacks of fever.

Tsetse-Fly Disease in Cattle.

Moore reports that 10-grain doses (or even more) of sodium arsenate, well diluted, and administered hypodermically once in fourteen days has a beneficial result in cases of tsetse-fly disease in the advanced stages in cattle. He has also noticed free in the plasma of trypanosoma infected cattle minute coccus-like bodies which unite in pairs, become very active, adhere and finally enter the red corpuscles, and after inducing changes in the corpuscles seem to escape from them, as the blood after a certain time contains immense numbers of trypanosomes.

Colonial Appointments, &c.

Dr. O. D. Honiball, Government Medical Officer of British Guiana, has obtained an extension of leave for seven weeks from November 21st.

Dr. W. E. Jones, Medical Superintendent of the Brecon and Radnor Joint Counties Asylum, has been selected, on the recommendation of the British Lunacy Commissioners, for the position of Inspector-General of Asylums for the Insane in Victoria, Australia. The office is one created under the recently-passed Lunacy Act, the salary attached to it being £1,500 a year.

EXCHANGES.

Annali di Medicina Navale. Annali d' Igiene Sperimentale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Medical Gazette. Indian Medical Record. Interstate Medical Journal. Janus. Journal of the Royal Army Medical Corps. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Transactions of the American Microscopical Society. Treatment. West India Committee Circular.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Publishers.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

TRYPANOSOMIASIS OR SLEEPING SICKNESS IN SIERRA LEONE.

By Dr. W. Renner, M.D.
Medical Officer.

Report of a Case in the Royal Colonial Hospital, Freetown.

Mankah, a Timne labourer, was admitted as an intern-patient on March 14th, 1904. He was thin and debilitated. He speaks the "Pidgin" English well enough to be understood, and gives the following history. He had worked as a labourer in the island of Fernando Po, and lately as a railway labourer in the Congo Free State, and only returned to Freetown three months ago. He complained of pain, shivering and tremor all over his body. In the ward his temperature was taken and found to be normal. Intellect good and clear. His tongue was furred and bowels not free. On the second day of his admission he was found sleeping at one end of the bed, his thigh and legs drawn up towards his body. He passes urine apparently involuntarily. He is easily roused up, and would sustain conversation for a short time, and then sleep. He seemed always dizzy. The nurse reported that he sleeps whilst taking food. His urine was drawn several times and on different days, and examined and found to contain no albumen. On March 17th he was removed to the operating theatre, placed under chloroform by Dr. Renner, M.O., and Major Frederick Smith, R.A.M.C., drew some cerebro-spinal fluid by lumbar puncture. This was centrifuged and examined. Trypanosomes were found in the fluid. Peripheral blood was drawn, stained and examined, and some parasites were found. On March 19th he was much livelier and not so drowsy. He moved about a little. This we attribute to the removal of pressure symptoms from the nervous system by the drawing away excess of cerebro-spinal fluid. By March 22nd he had lapsed again to his former condition, and was growing worse. On April 9th the drowsiness was becoming deeper, and the patient took very little food and had to be fed. He is very emaciated. Temperature subnormal. He answers questions with difficulty. The Hon. Dr. W. T. Prout, P.M.O., examined the peripheral blood, and found trypanosomes in the fresh and stained specimen. Patient died on April 11th. *Post mortem*, held twelve hours after death, showed cadaveric rigidity feeble. Emaciation marked. On the removal of the skull a large quantity of cerebro-spinal fluid escaped. The membranes of the brain are pale; cerebral vessels are slightly congested. Weight of brain 3 lbs. Lungs, kidney and liver are normal; spleen slightly enlarged, and weighed 12 oz.

Sleeping Sickness and Beri-Beri.

The subject of sleeping sickness in Sierra Leone is of great interest. It has been supposed that this disease was endemic in this colony, and writers of the earliest period have always looked upon it as such; but with closer and better knowledge of the disease, it has been found that up to the present there is not sufficient evidence to show that the disease was endemic. Writers such as Dr. Winterbottom, Colonial Surgeon of Sierra Leone, and Dr. Robert Clarke, Senior Assistant Colonial Surgeon, Sierra Leone, have in their respective works described the disease under the term of lethargus and sleeping dropsy. From their descriptions one concludes that they have evidently mixed up two distinct diseases, viz., beri-beri and the sleeping sickness.

During the height of the slave trade, and even later on in the fifties, large batches of slaves who were landed here (Freetown), and located in the villages of Kissy, York, and Charlotte, died from two causes, beri-beri and sleeping sickness. The slaves from the lower Congo basin die mostly from sleeping sickness. Those from the Bights and Upper Guinea Coast die from beri-beri. Then there were those, again, who die from the combined disease. Some of the old men living to-day, who were landed here as boys in the fifties and during the closing years of the slave trade, could remember the time when some of their comrades, with whom they had been speaking, died suddenly a few minutes after. One of these old men describes the symptoms as follows: In some of them their feet were swollen, they breathed with difficulty. Some were able to walk about till they dropped down suddenly and died. Others were paralysed and suffered from dropsy. Then, again, there were those who were noticed to commence to sleep whilst on board ship and die soon after landing. Some commence to sleep soon after landing, sleep over their food, and sleep until death.

The pictures thus given are not strange when one thinks of the slave ship, crowded with its human cargo, ill-fed, confined in the ill-ventilated hold and never allowed to leave it—a true description of the conditions which induce beri-beri. In the slave depôt of Bounce Island, up the Sierra Leone River, where large numbers of slaves, brought down from Port Lohkoh and other centres of the hinterland, were lodged in crowded underground tunnels to await the slavers, it was said that large numbers of them died from the sleeping dropsy, which is no other disease than beri-beri. At no time, other than during the dark period of this colony, when the slave trade was at its height, could the disease of the sleeping sickness be said to have raged epidemically. For after that period only occasionally are cases of sleeping sickness noticed; and thus, when the history of the case is gone into properly, it is found that they had come from outside the Sierra Leone Coast and its hinterland. It is strange, indeed, that the disease has not become endemic, for the tsetse-fly (*Glossina palpalis*), which is the medium by which the trypanosome is inoculated into man, is said to be present in this colony (Austen), and has been found at Kissy, Regent, &c. Perhaps there are peculiar conditions necessary, and which we have not yet discovered, for this to take place. So far, Sierra Leone and its hinterland may be said to be outside the region affected by the sleeping sickness. This would have been otherwise if the large numbers of the Mendi and Timne labourers who were sent to work in various parts of the Congo Free State had returned home; for, as it was reported, a large number were enlisted as soldiers

when they got down to the Congo and perished in the continued warfare waged by the State amongst the natives. A very large number, indeed, also perished from disease, neglect and want. Those that returned home suffered from beri-beri and sleeping sickness, and scattered into various parts of the hinterland. With this influx, however, the presence of sleeping sickness in the hinterland is at present rare.

At present there is a keen rivalry existing between the members of the civil medical officers in search of sleeping sickness arising in the colony, and every case of the suspected disease is critically examined. From the natives one may be misled to think that the disease is prevalent here, as they believe that every case of the enlarged gland of the neck is due to, or is the commencement of the, sleeping sickness, consequently one sees a large number of children of both sexes, men and women also, with scars about their neck, the result of their glands having been removed at some period or other.

KALA-AZAR, OR TROPICAL SPLENOMEGALY.

Abstracted from a Paper sent by Guy R. Ruata, M.D., of Rome,

Formerly of the London School of Tropical Medicine.

Definition.

An infectious disease running a subacute or chronic course, nearly always fatal, characterised by fever of an intermittent or remittent type, anæmia, wasting, enlargement of the spleen and liver, and not infrequently hyper-pigmentation of the skin.

Geographical Distribution.

According to Captain Leonard Rogers, I.M.S., the disease was at one time considered peculiar to the Province of Assam, where it was first noted in 1872. Subsequently it was described as occurring in 1887, in Bengal and along the Brahmapootra River. The Burdwan fever which prevailed from 1850 to 1870, and the disease named kala-dukh in the Terai, are similar to, if not identical with, kala-azar. There can be no doubt, however, that kala-azar is met with in many parts of India, South China, and various tropical countries.

Epidemiology.—Kala-azar prevails in Assam during the rainy season, from April to September. The disease would appear to be spread from man to man, and to be especially severe in densely populated districts. Isolated villages, even in the centre of a district in which an epidemic of kala-azar rages, may wholly escape infection, owing to limitation of intercourse. Infection proceeds along the lines of communication. After devastating a neighbourhood the disease may wholly disappear for several years. Old and young, without distinction of sex, seem to suffer from kala-azar. It would appear as though opium-smokers suffered less than other members of the community.

Signs and Symptoms.—Kala-azar begins with rigors, and the fever which follows is usually remittent, but occasionally intermittent in type. The pyrexia is seldom high, and in about half the cases it is owing to some complications such as anæmia, wasting, diarrhœa, or œdema that compels the sufferers to seek advice. The initial attack lasts for periods varying from two to six weeks or longer; it is succeeded by a period of apyrexia also indefinite in its duration, to be followed by recurrences and repetitions of a high temperature. The patient during these recurrences may be unaware that he has a high temperature, and declares that he has no fever. It would appear, therefore, that there are two clinical types of kala-azar.

I. The Subacute Form

Is characterised by fever of a severe remitting type, marked anæmia and, in course of time, pronounced cachexia. The febrile attack commences with rigors, followed by high temperature and profuse sweating. Anæmia advances day by day, the spleen and liver enlarge, cachexia increases, and the patient dies in a few months of acute or subacute enterocolitis, pneumonia, or thrombosis of a cerebral vessel.

II. The Chronic Form.

The symptoms in the chronic form are less decided; the anæmia and fever are less marked, and the sweating is less severe and more irregular. In course of time œdema appears about the feet and ankles, fluid is effused into the serum cavities, and into the subcutaneous tissues of the face, causing a state somewhat akin to the appearance we are familiar with in beri-beri or ankylostomiasis. Malarial fever is excluded by the resistance of the symptoms to quinine, the absence of periodicity and of the malarial parasites from the blood.

In addition to the above symptoms, we find rheumatic pains in the joints and muscles, frontal headache and neuralgia, hæmorrhage from the gums and intestines, and loss of hair. In almost every case the appetite is good, the tongue may remain clean, but it is more frequently reported to be black, and the skin becomes pigmented, hence the name black fever—kala-azar. The cutaneous pigmentation may be general or it may be limited to definite areas, appearing on the mucous membrane of the mouth, on the face, the forearms, knees, or legs.

The course of the temperature in kala-azar resembles that of Malta fever in its continuity, falling to the normal in the morning, rising in the evening, and continuing for weeks, or it may be months, with persistent intermittency. The patient, as the febrile state continues, becomes wasted to a degree, with loss of muscular energy, and attains a state of drowsiness and intellectual negation. In contrast to the lean chest, however, the abdomen is swollen and puffy, due to enlarged liver and spleen and a certain degree of ascites. There may be, in addition, effusion into the pleura and pericardium.

Differentiation of Kala-Azar and Ankylostomiasis.

Kala-Azar.	Ankylostomiasis.
Ushered in suddenly with fever.	Begins insidiously with intestinal troubles and general weakness.
Lasts four to nine months generally (Rogers). Mortality 96 per cent.	Lasts two or three years (Sandwith). Mortality 3 per cent. Lutz observed 787 cases without any death.

Kala-Azar.	Ankylostomiasis.
The infection occurs during the warm season.	Occurs in every season uniformly.
Age—25 per cent. under 10 years, 50 per cent. under 20 years.	Age—2 per cent. under 10 years, 40 per cent. under 20 years.
The fever has frequent remissions.	Fever absent (Sandwith), subnormal temperature (Giles).
Brown atrophy of the heart.	Heart enlarged and pale.
Spleen always much enlarged, in 56 per cent. it reaches the umbilicus or even below it.	Spleen never enlarged.
Liver enlarged.	Liver frequently reduced in size.
Œdema absent in 50 per cent. of cases, mild in feet only in 30 per cent. or even more.	Œdema of the face observed early (Lutz); always manifest in the late stages in the limbs.
Anæmia constant, increasing with the fever, but improving when this is absent.	Anæmia always progressive.
In the late stages of the disease diarrhœa is present in 73 per cent. of cases.	Serious constipation in 60 per cent. (Sandwith).
Death from fever, or from its complications.	Death from anæmia, serous effusions and asthenia.

Ocular Symptoms.—The arterial ocular circulation is deficient, the arteries at the fundus of the eye showing constriction, whilst the veins are dilated. Rogers observed restriction of the field of vision.

Respiratory Organs.—Breathing is hastened, hypostatic congestion is not uncommon, followed occasionally by lobar pneumonia. Acute œdema of the lungs may supervene in patients with pleural effusion.

Genito-urinary Symptoms.—Sexual power is paralysed. The urine frequently shows albumen and phosphates, and the dark colour of the urine is due to hæmoglobin.

The spleen is hard and firm in chronic cases, rather soft in the subacute variety of the disease. In every case the spleen is enlarged; in 26·5 per cent. the spleen advanced three fingers' breadths below the margin of the left ribs; in 56·5 per cent. the spleen reached the level of the umbilicus; and in 27 per cent. it comes as low as the left anterior superior iliac spine. The accompanying perisplenitis causes severe pain, especially on handling the left hypochondriac region.

The liver swells, and owing to frequent perisplenitis is tender on palpation.

Etiology.

The disease was first described in 1882 by Dr. Clarke. He was of opinion that it was of malarial origin. Dr. Dobson, in his report of 1884, held the same opinion. Lieut.-Col. Giles, in a note published in May, 1890, in the "Assam Sanitary Report," thinks that kala-azar may be a form of ankylostomiasis connected with malaria. Leonard Rogers, in his excellent report of 1897, thinks that the disease is but a more serious form of malaria. Ross, in the "Report upon the Nature of Kala-Azar" (1898), considers it a form of post-malarial cachexia. Bentley, on the other hand, advanced the view that this disease is a malignant form of Mediteranean fever; but the greater degree of infectivity, the high mortality, the constant hypertrophy of the spleen and liver, the greater degree of emaciation, and the absence of serious neuralgic symptoms present in kala-azar, all point to an essential clinical difference between Malta fever and kala-azar.

Manson denies its malarial nature because it does not respond to the three pathognomonic tests of malaria: periodicity, amenability to quinine, the presence of the parasite in the blood. The fever, when it is present, is quotidian; quinine is useless; the infection especially strikes the acclimatised, producing a frightful mortality; all facts incompatible with malaria.

In May, 1903, Major Leishman, in a paper in the *British Medical Journal*, recorded the presence of some bodies, which he believed to be trypanosomal. He had observed these bodies in November, 1900, in the splenic pulp of some persons who died from a fever presenting the same symptoms as kala-azar, and named from the place he first saw the disease, "Dum-Dum fever." Those bodies were abundant, round or oval, 2 or 3 μ in diameter, staining with Romanowsky's method; showed abundant chromatin; possessed a defined and regular shape, which clearly distinguished them from the blood platelets and other bodies. The chromatin was circular in shape, but with it, although not apparently connected therewith, there was another smaller spot of chromatin usually of a bacillary shape, lying perpendicularly or tangentially to the greater circumference. Leishman regarded this as a trypanosome, in which the undulating membrane had disappeared, the intrasplenic destruction of the parasite happening during the life of the patient, leaving behind the nucleus and micronucleus shrunk into a small mass.

In July, 1903, Major Donovan published in the *British Medical Journal* that he had found, in April, 1903, similar bodies in the splenic pulp of three persons who died from a chronic form of malaria in Madras; he thought those bodies might be degenerated spleen cells. Having afterwards aspirated during life some blood from the spleen of a boy suffering from a chronic form of malaria, Donovan was able to confirm Leishman's discovery. Donovan noted that the possibility of any *post-mortem* alterations was excluded. Donovan, besides, from June 17th, 1903, to November 5th, 1903, found those bodies in sixteen patients.

Ross, who examined Donovan's films, was of the opinion that those bodies may belong to a new sporozoon, which he should name Leishmania. Laveran and Mesnil, on the other hand, who examined Donovan's films, found the parasite in pear-shape, oval, or even spherical forms, free or intracorpuscular. They describe them as follows: "The pear-shaped bodies measure 2·5 to 4 μ in length by 1·5 in breadth. In those elements, as well as in the circular and oval forms, may be distinguished a chromatic sphere or karyosoma, placed into the pear-shaped elements. In the larger extremity, on the same transverse diameter of the mass, is another bacillary-like, or roundish body. The contents of the parasite are granular and clear. The blood corpuscles containing the parasite alter readily; the number of parasites in the red blood corpuscles varies from 1 to 14, then the corpuscles are hypertrophied. The number of the free bodies is more considerable than the intracorpuscular."

Leishman also, who examined Donovan's slides, notes that some bodies are intracorpuscular (*British Medical Journal*, November 21st, 1903).

Laveran and Mesnil consider that the parasites, always without any pigment, may be included in the mono- or polynuclear leucocytes. They believe that it may be a new species of genus *Piroplasma*, so they called it *Piroplasma donovani* (see *Comptes Rendu des Séances de l'Académie des Sciences*, December 7th, 1903).

Marchand and Ledingham, in the *Lancet* (January 16th, 1904), relate the occurrence of those parasites in a German soldier lately returned from Pekin. It is very interesting to remark that the soldier ascribes the beginning of the disease to the bite of a fly.

Leishman, moreover (*British Medical Journal*, January 6th, 1904), saw those bodies in blood films from the spleen and liver belonging to two soldiers, one coming from Dum-Dum, the other from Barrackpore, near Dum-Dum, in Bengal.

It is of interest, also, to notice the perfect resemblance of those parasites with those discovered by Dr. James H. Wright (*The Journal of Medical Research*, Boston, December, 1903) in a case of tropical ulcer or oriental sore. Wright found in the cells of the tissue a great number of small bodies, to which he refers the specific infective nature and which he calls *Helcosoma tropicum.*

Ross had previously found in the pus of oriental sores numerous flagellated organisms, the *Cercomonas hominis.*

Condition of the Blood.

In a case of kala-azar which I had the opportunity of studying in the wards of the Seamen's Hospital, at the London School of Tropical Medicine, under the care of Sir Patrick Manson, the blood films, prepared by Dr. G. C. Low, and stained by Leishman, Romanowsky and Nocard methods, showed the presence of Leishman - Donovan bodies. These were never found in the peripheral blood.

Examination of Blood.

The result of a careful examination of the blood in the laboratory of the London School of Tropical Medicine, by Dr. G. C. Low showed—

—	December 17	December 18. Splenic puncture	December 30. Puncture of the spleen and liver
Erythrocytes	3,500,000	3,650,000	4,000,000
Leucocytes	3,700	3,100	3,120
Hæmoglobin	56 %	57 %	64 %
Polymorphonuclear ..	40 %	42 %	44 %
Large mononuclear ..	13 %	11 %	10 %
Lymphocytes.. ..	41 %	41 %	40 %
Eosinophile cells ..	2 %	2 %	1·1 %
Transitory cells ..	—	1 %	2·1 %
Nucleated erythrocytes	1 %	—	—
Malarial parasites ..	—	—	—

Marchand and Ledingham's description of the parasite found in the spleen, liver and bone-marrow (*Lancet*, January 16th, 1904) is as follows: "In the cells of the spleen pulp were found an extraordinary number of peculiar bodies of about 1 μ to 1·5 μ in diameter and which stained intensely with nuclear stains (hæmatoxylin, carbol-fuchsin, &c.). These bodies at first sight reminded one of micrococci, but under the higher powers of the microscope presented themselves in the great majority of cases as distinctly ring-shaped. Some of the pulp cells showed rather advanced degeneration of their nuclei. The portal capillaries of the liver contained very numerous large cells of an amœba type, which in many cases completely blocked the lumen of the vessel. These large cells possessed in their interior, besides their nucleus proper, a very large number of the same small bodies above described, which frequently lay in larger clumps in vacuoles of the cell protoplasm. Very often, too, besides the small bodies the protoplasm of these large cells included leucocytes, sometimes not a few. The marrow likewise contained in addition to the usual marrow cells large numbers of the same huge amœba-like phagocytes, which inclosed in their interior extraordinarily numerous small bodies of the same nature, as well as red blood corpuscles. It is to be noted, however, that the bodies were never found in the interior of the red blood corpuscles and that pigment formation was never associated with them. Under high magnification the bodies exhibited surprisingly regular forms; the majority were of a signet-ring shape with a clear centre; in a large number of them there lay beside this ring-shaped chromatin body a second and much more intensely stained (especially with carbol-fuchsin) dot of rounded or slightly elongated contour and which sat directly on the larger body or was separated therefrom by a small space. Generally this smaller body was situated with its long axis perpendicular to the surface of the larger or sometimes also tangential to it. Many of these bodies, and not only those lying in the cell vacuoles but also those which are to be found not infrequently lying free amongst the cells, were surrounded by a very fine faintly stained roundish or somewhat elongated halo of from 2 μ to 3 μ in diameter."

Yellow Fever.

Longua, M. A. Differential Diagnosis of Yellow Fever. *Presse Médical*, No. 63, 1904.—Severe cases of pernicious malarial fever and fulminating yellow fever are difficult of exact diagnosis, more especially when jaundice is absent, as happens in some cases of yellow fever. The microscope and the remedial action of quinine serve to clear up the diagnosis.

Rodrigues, B. Treatment of Yellow Fever by Anti-ophidic Serum. *Brazil Medico*, vol. xviii., No. 21.—Rodrigues reports recovery in twenty-three out of twenty-four yellow fever cases treated by anticrotalic and antibothropic serum. Other observers, such as Seidl, Marchoux and Simond do not support Rodrigues' conclusions.

Sodre, A. de A. Hæmatology of Yellow Fever. *Brazil Medico*, vol. xviii., No. 22.

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THE

Journal of Tropical Medicine

NOVEMBER 15, 1904.

THE GEONOMIC THEORY OF DISEASE.

IN more than one direction recently attempts have been made to revive the theory that disease travels from east to west, or in a direction opposite to the revolution of the earth on its axis. Stated shortly, the geonomic theory of the spread of disease is based on the belief that the earth in its revolution, owing to its greater weight, travels faster than the lighter atmosphere surrounding it. The air being a slower traveller than the earth is brought, therefore, in contact with the earth's surface in a direction from east to west. Should any disease germs (?) attain a high altitude they would in time fall from the air on to the earth in the path of the earth's revolution and infect countries to the westward of the original focus.

In support of this statement it is advanced that all Asia-European epidemics have travelled in the direction indicated, namely, from east to west; and the cause of this course of the diseases is ascribed not to the lines of communication, nor to the aerial currents, but to the fact that disease germs arising in a given locality ascend high in the atmosphere, and attack the countries which in accordance with the revolution of the earth come successively under this germ-bearing cloud. The writer in the *Pioneer* of September 22nd, 1904, attributes the course of plague to this geonomic factor, and shows how plague has travelled and is travelling from China across Asia to the confines of Europe.

As long ago as 1891, Mr. J. Thorne Roe advanced the theory that influenza spread under this so-called geonomic influence. He attributed influenza to the fine dust rising from the devastated villages along the bed of the Yellow River in China owing to the inundations caused by that river in the year 1887. The deaths of millions of inhabitants by this local flood served to still further pollute the marsh and dust-laden air according to Mr. Roe, and he asks: "Would not the effluvia and dust arising, often in the minutest particles, which exhale from putrefying animal or vegetable substances, be sufficient to infect distant lands, providing the air current and weather were favourable for conveying these poisonous vapours or the particles of pulverised mud charged with these germs of disease?" In support of this idea he quoted the eruption of Krakatoa volcano in August, 1883, the cloud of dust from which was reported by a Committee of the Royal Society to have passed three times round the globe. From this fact he argued that the marshy districts of China stand to disease germs as did Krakatoa to the presence of fine dust in the air.

Mr. Roe further contends that influenza is endemic in China and that its journey round the world is only an example of an endemic disease becoming epidemic in other countries. There can be no doubt that the Russians regarded influenza in 1889 as a Chinese disease first, as in Western Europe it was called Russian. The continent of America was attacked subsequently to Europe and it spread in the United States from the Atlantic to the Pacific littoral. More-

over, when influenza attacked China in 1890-1 (the second epidemic in China) the disease was called Japanese. This cycle would seem to support the theory of geonomy, as a complete circle of the earth was made in a direction from east to west, that is, in the direction opposite to the revolution of the earth on its axis.

The same westerly course of disease has been observed in cholera, dengue fever, and even small-pox; and now plague in its geographical distribution is held to obey the same laws.

Evidence of a conclusive nature is against the geonomic theory in such diseases as small-pox cholera, and plague. Infection follows the lines of communication so markedly in these diseases that no meteorological factors are required to explain their spread. There is, however, a certain colouring in favour of influenza being thus conveyed. The infection travelled so quickly that it outstripped even modern rapid communication. Madrid was attacked within twenty-four hours after influenza declared itself in St. Petersburg. In all previous outbreaks of influenza also, the same rapid distribution of the disease was noted, quite apart from lines of communication. No evidence to this effect is more convincing than the account of a fleet of five men-of-war crossing the Atlantic about the beginning of the nineteenth century, on its way from the West Indies to England, when three-fifths of the crews were suddenly prostrated by influenza, which was then prevalent in England, and further, that within a day or two after the crews of these ships were attacked, influenza occurred in New York.

But what may be true of influenza need not be true of other ailments. Influenza may show compliance with the geonomic theory to those that seek in that direction, but when such slowly-travelling ailments as plague and small-pox are attempted to be explained on the same basis, few will believe the dogma.

Unfortunately the germ of influenza, if there be one, has not been found. Several have claimed its discovery, but none of their observations have stood accurate scientific tests. We, are therefore, no further advanced than when the disease was first named, and remain content to ascribe the disease to an "influence"; and however far-fetched and improbable the geonomic theory of its mode of infection may seem, it is the only one seriously advanced to-day.

Plague.

PREVALENCE OF THE DISEASE.

India.—During the weeks ending October 15th and 22nd, deaths from plague numbered 16,111 and 13,871 respectively.

South Africa.—At Port Elizabeth during the weeks ending October 15th and 22nd, the fresh cases numbered 0 and 1; deaths 0 and 0. On October 22nd 3 cases were under treatment.

Mauritius.—During the weeks ending November 3rd and 10th, fresh cases 16 and 21; deaths 13 and 9.

Hong-Kong.—During week ending November 12th, fresh cases 1; deaths 1.

EXAMINATION IN TROPICAL MEDICINE AND HYGIENE.

UNIVERSITY OF CAMBRIDGE.

REGULATIONS FOR THE EXAMINATION IN TROPICAL MEDICINE AND HYGIENE CONDUCTED BY THE STATE MEDICINE SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE.

Two Examinations in Tropical Medicine and Hygiene will be held in Cambridge during the year 1905. The first Examination will begin on **January 10th,** and the second on **August 15th.** Each Examination will extend over four days.

Any person whose name is on the *Medical Register* is admissible as a Candidate to this Examination, provided—

(I.) that a period of not less than twelve months have elapsed between his attainment of a registrable qualification and his admission to the Examination;

(II.) that he produce evidence, satisfactory to the Syndicate, that he has diligently studied Pathology (including parasitology and bacteriology) in relation to Tropical Diseases, Clinical Medicine and Surgery at a Hospital for Tropical Diseases, and Hygiene and Methods of Sanitation applicable to Tropical Climates.

*** As evidence of study and attainments a Candidate may present to the Syndicate (1) any dissertation, memoir, or other record of work carried out by himself on a subject connected with Tropical Medicine or Hygiene; (2) any Certificate or Diploma in Public Health or Sanitary Science he may have obtained from a recognised Examining Body. Such evidence will be considered by the Syndicate in determining whether he is qualified for admission to the Examination, and by the Examiners in determining whether, if admitted, he shall be included in the list of successful Candidates.

The Examination will have reference to the nature, incidence, prevention, and treatment of the epidemic and other diseases prevalent in Tropical Countries. It will comprise the following subjects:—

(1) The methods of pathological and bacteriological investigation. The examination of the blood. The characters, diagnosis, and life-history of animal and vegetable parasites. The examination, chemical and microscopic, of poisonous or contaminated foods and waters.

(2) The origin, pathology, propagation, distribution, prevention, symptoms, diagnosis, and treatment of the epidemic, endemic, and other diseases of Tropical climates, including — Malaria; Blackwater Fever; Trypanosomiasis; Relapsing Fever; Dengue; Yellow Fever; Plague; Tetanus; Beri-beri; Dysentery and Hepatic Abscess, Cholera, Enteric Fever, Malta Fever, and Specific Diarrhœal affections of the Tropics; Diseases due to Cestode and other worms; Filariasis; Bilharzial disease; Specific Boils, Sores, and other Cutaneous affections; Mycetoma; Ophthalmic affections of the Tropics; affections caused by Poisonous Plants and Animals, and by Poisoned Weapons; Sunstroke.

(3) The general effects on health in the Tropics of seasons and climate, soil, water, and food. Personal hygiene, acclimatisation. Principles of general hygiene, with special reference to food- and water-supplies, sites, dwellings, drainage, and the disposal of refuse. The Sanitation of native quarters, camps, plantations, factories, hospitals, asylums, jails, pilgrim and coolie ships. Principles and methods of disinfection.

The Examination will be partly in writing, partly oral, and partly practical and clinical. The clinical part will be conducted at a Hospital for Tropical Diseases, at which cases will be submitted for diagnosis and comment.

Every Candidate will be required to pay a fee of six guineas before admission or readmission to the Examination. A Candidate who, after being approved for admission, fails to present himself at the Examination, will not have the fee returned, but will be entitled to present himself without further fee on *one* subsequent occasion.

Every Candidate who passes the Examination to the satisfaction of the Examiners will receive from the University a Diploma testifying to his knowledge and skill in Tropical Medicine and Hygiene.

All applications for information respecting the Examination should be addressed to G. H. F. Nuttall, F.R.S., Pathological Laboratory, Cambridge.

Candidates who desire to present themselves for the Examination must send in their applications on forms supplied for the purpose, and transmit them, together with the required evidence of study, and the fee of six guineas, to The Registrary of the University Registry, Cambridge, not later than July 25th. Cheques should be crossed "Barclay and Co., Ltd."

Cambridge,
August, 1904.

EXAMINATION PAPERS.

August, 1904.

Pathology, Including Bacteriology and Parasitology.

Written Examination.

(1) Describe in detail the methods you would adopt to determine the presence of plague amongst rats on ship-board, stating the facts upon which you would base a positive pathological and bacteriological diagnosis.

(2) Describe the Guinea-worm, what you know of its structure, biology, geographical distribution and pathogenic effects.

(3) Describe the main differences between the parasites of quartan, benign tertian, and malignant tertian (æstivo-autumnal) malarial fever, the parasites being viewed in freshly-drawn unstained blood.

(4) State how you would prepare nutrient bouillon of ordinary composition for the cultivation of bacteria.

Pathology, including Bacteriology and Parasitology.

Practical and Oral Examination.

(1) Prepare and mount the paraffin sections supplied. Stain them by Gram's method, and by any other method you choose, and describe the tissue and organism found.

(2) Stain the blood film supplied by means of the Leishman or Jenner method and describe what you find.

(3) Examine the culture supplied and report thereon. Also prepare aerobic plate cultures (agar) thereof, with the object of obtaining a pure culture.

(4) Oral examination on specimens placed under microscopes, &c.

Medicine and Surgery.

Written Examination.

(1) In what tropical diseases do fever and enlargement of the spleen concur? How would you diagnose these diseases?

(2) In what tropical diseases do one or more of the following symptoms occur: Hæmoptysis, hæmaturia, blood in the stools? How would you diagnose them?

(3) Give the symptoms, diagnosis and treatment of a severe case of ankylostomiasis.

(4) What is the incubation period of yellow fever? How would you diagnose it from (*a*) malarial fever, (*b*) blackwater fever, and how would you manage the case so as to prevent the spread of the disease?

Medicine and Surgery.

Practical and Oral Examination.

This examination was conducted in the wards of the Seamen's Hospital Society's Branch Hospital, Royal Albert Dock, London, E. Candidates were required to make bed-side diagnoses; microscopes, stains, &c., being provided for the examination of the blood.

Hygiene and Sanitation.

Written Examination.

(1) Mention the various methods which may be employed for determining the amount of malaria in a locality and discuss the various advantages and disadvantages of each.

(2) Name the species of mosquitoes which have been proved to be capable of carrying human malaria and yellow fever. Enumerate the measures which can be taken against these diseases, mentioning the circumstances under which each measure promises to be the most feasible.

(3) What measures would you adopt in order to

prevent the entry or arrest the progress of cholera (*a*) in a native city, and (*b*) in a European settlement situated amongst a native population?

Practical and Oral Examination.

Candidates were required to draw sections of surface drains suited for tropical towns, to identify various blood-sucking *Diptera* and *Arachnida*, to answer questions relating to the mode of transmission and prevention of various tropical diseases, to describe the methods of bacteriological water analysis, &c.; the questions being framed so as to demonstrate as far as possible the *practical* knowledge possessed by the candidates.

List of Persons on the Medical Register who Hold the Diploma in Tropical Medicine and Hygiene of the University of Cambridge.

Passed the first examination held August, 1904:—

Cleveland, Robert Achilles.
Douglas, Archibald Robert John.
Elliott, Gilbert.
Gerrard, Percy Netterville.
Heanley, Charles Montague.
Statham, John Charles Baron.
Suvoong, Cornelius Agnew.
Thomson, John Christopher.

Note.—With one exception all the Candidates who presented themselves and passed the Examination had studied at the London School of Tropical Medicine. With one exception all of the eight had had considerable experience in the Tropics. Six out of the eight held the D.P.H.

Of the Candidates who failed (four in number), one had studied at the London School of Tropical Medicine; the other three had not taken a course in a School of Tropical Medicine. These four had had some experience in Tropical Diseases abroad; but one out of the four held the D.P.H.

It would appear from the foregoing that a course in Tropical Medicine either at the London or Liverpool School, tropical experience, and previous training, represented by the holding of the D.P.H., are conditions which greatly increase the chances of the candidates satisfying the Examiners.

The Examiners appointed for the year 1905 are Sir Patrick Manson, K.C.M.G., F.R.S.; Dr. G. H. F. Nuttall, F.R.S., and Professor R. Ross, C.B., F.R.S.

ANKYLOSTOMIASIS

By C. P. Kennard, M.D.(Edin.), M.R.C.S.
Government Medical Officer.

"*The British Guiana Medical Annual,*" *Abstract.*

The amount of injury caused by the presence of ankylostomes in the intestine still appears to be a matter of opinion; some state that their presence is harmless, others (and they are the majority) consider them injurious.

Dr. Kennard has collected notes during eighteen months of about 300 cases of ankylostomiasis. He draws particular attention to the variability of the number of ova in the stools, and states that when many ova are seen it is very probable that there are many ankylostomes, but the reverse is not necessarily correct. The pigmentation of the tongue is not a sign of any diagnostic value. Anæmia, vague abdominal pains and signs of dyspepsia are the more constant symptoms of ankylostomiasis. The removal of the ankylostomes by treatment, followed by a disappearance of the anæmia, seem to indicate conclusively that ankylostomes cause anæmia and are harmful.

Post-mortem appearance showed in cases of ankylostomiasis numerous ankylostomes in the duodenum and intestines generally and a great increase of adherent mucus. No ulcers or signs of hæmorrhage were present, but the intestines were generally pale, with some thickening and thinning of different parts.

Dr. Kennard attaches great importance to the marked increase of mucus where the ankylostomes are, inasmuch as it is calculated to render treatment ineffective for their removal. The catarrhal process also leads to the food not being properly digested, so that even in the event of the worms being removed, the anæmia is still kept up, the food is not properly digested, and deleterious material is absorbed.

As to the relationship of anæmia and bleeding from the small punctures made by the ankylostomes, Kennard thinks that the bleeding is exceptional. The presence of eosinophiles, which also occurs in non-sucking worms, appears rather in favour of blood change taking place from absorption of abnormal material.

The rapid removal of the deleterious matter forms part and parcel of the general treatment for ankylostomes, and may have to do with the relief of the anæmia which follows the use of thymol and a purge.

The usual treatment for ankylostomiasis consists in the administration of (1) calomel, grains v., (2) followed by sulphate of magnesium, and then (3) thymol, grains xxx., in three early hourly doses; (4) on the following day another dose of sulphate of magnesium.

When thymol failed Kennard tried alkalies, acids in large doses, cod liver oil, crab oil, santonin, thymol (grains x. or grains xv.) twice daily, followed by a purge, with very little effect. In cases of long standing the great deterrent to speedy cure is, no doubt, the catarrhal condition which has been set up, and the thick mucus affording protection to the worms.

To ensure a cure, therefore, it is expedient to diet the patient properly, and attempt to get rid of the catarrhal state to some extent before giving the thymol.

The efficacy of the large dose of thymol in ankylostomiasis in preference to smaller doses given, say, twice daily seems to be conclusively proved.

Method of Infection.

The general opinion is that the ova of the ankylostome are conveyed to the mouth through eating with dirty hands. The East Indian defecates pretty well where he pleases, and the soil in which he works becomes contaminated. He, however, washes his hands before eating, and it would seem that the infection must be by some other channel. Kennard is of opinion it is by the water the ova reach the

human being. It may be remarked here, however, that the hand washing is a mere ceremony; a little running water is allowed to pass over the hands. There is no thoroughness in the washing and the nails are not cleaned, so that soil containing ova may, and does, remain there to contaminate the food which is put in the mouth by the hands.

Development of Ankylostome Ova in Water.

Dr. C. P. Kennard undertook experiments to ascertain whether ankylostome ova can develop in water. A small portion of human fæces put in a watch-glass with earth was kept wet by adding water when required. In eight days ova were found, mostly segmented. After fifteen days very long, actively moving, thin worms were seen with a clear sheath, undulating in movement, and differentiated contents measuring ½ mm. in length. After twenty-three days a larger worm was found, with about two-thirds down an oval patch with indefined cells—possibly the commencement of reproductive organs. Dr. Kennard, in order to study the development more closely, spread a small piece of fæces on a slide and kept moist with water; most of the ova were segmented, but one contained the form of a worm in a shell; after being exposed to the sun for some time it was seen to move. It was then put on the hot stage, which appeared to increase the movement when the slide was a little warm, but if too hot the movements ceased; in about six hours' time it had escaped from its shell and was precisely similar to those above described. The slide was kept moist in a damp chamber, which was dark, and during the night several other worms had developed.

Reprint.

NOTES ON THE TROPICAL DISEASES OF BRITISH GUIANA.

By A. T. Ozzard, M.R.C.S.Eng., L.S.A.
Resident Surgeon, Public Hospital, Suddie.

From the British Guiana Medical Annual, 1904.

The following are short notes on the common tropical diseases of British Guiana, on the lines of the papers by Drs. Wellman and Andrew Balfour, recently published in the Journal of Tropical Medicine, February 15th, 1904, and April 15th, 1904. As the Editors of the Journal of Tropical Medicine seem desirous of obtaining similar articles from all parts of the Tropics, I hope these notes may not be amiss. The arrangement is exactly similar to that of Drs. Wellman and Balfour.

I. Diseases Appearing from an Examination of the Blood.

Malaria.—All forms of the malaria parasite can be commonly found here. The most common are the benign tertian and the malignant tertian. The quartan is not nearly so commonly found as the other two.

The malignant tertian with crescents is fairly common. Ague attacks occur, but are not often seen. Remittent fevers are fairly common. Enlarged spleens due to malaria are very common (*vide* Dr. Daniels' paper, *Brit. Guiana Med. Annual,* 1895, p. 57). So far no one has recorded the presence here of the new blood parasite, *Leishmania donovani,* though with a little more time I have no doubt but that it will be found.

Filariasis is very common all over the Colony. In a series of cases examined by me in New Amsterdam, Berbice, I found the presence of *F. nocturna* in 28 per cent. In 72 Aboriginal Indians from the Berbice River I found the so-called *F. Ozzardi* in no less than 45. In 348 cases examined by Dr. Daniels he found *F. nocturna* in 52; and of 99 Aboriginal Indians he found the *F. Ozzardi* in 55. Dr. Low's series of cases of filariasis in Aboriginal Indians gave a percentage of 57 or 58.

Needless to say, filarial diseases are extremely common, notably, filarial abscesses, elephantiasis, varicose groin glands, lymph scrotum, chylocele, &c.

Leucocyte Variation.—Excess of large mononuclears can always be demonstrated in marked cases of malaria. Eosinophilia is invariably noted in cases of filariasis, and especially in those of ankylostomiasis; in the latter it is extremely well marked.

Trypanosomiasis has so far not been encountered. If, as seems probable, it is always accompanied by the symptoms of sleeping sickness, it seems likely that we may not meet the trypanosome at all in British Guiana. A very definite opinion has been given that sleeping sickness does not exist in British Guiana. I think, however, that this opinion is a little premature. Until the diseases of the Aboriginal Indians have been scientifically investigated, I decline to admit that sleeping sickness does not exist here.

I have so far not come across the *Glossina palpalis* or *G. morsitans.*

II. Diseases Appearing from an Examination of the Fæces.

Dysentery is very common, and occurs from the simple catarrhal form to the most virulent gangrenous affection. The amœbic form is very common, and the wash-leather-looking ulcers mentioned by Leonard Rogers are fairly commonly met with on the *post-mortem* table. The *Amœba coli* is common.

Epidemic gangrenous rectitis, known here as "caribi" or "buck-sick," is said to be common amongst the Aboriginal Indians. I have only seen one or two cases, simply, I presume, because these Indians so rarely come to hospital for treatment.

Ankylostomiasis is extremely prevalent throughout the colony, and causes an enormous loss of labour on the sugar estates. Several papers on this subject have appeared in former volumes of this Annual, notably by Drs. Daniels, Conyers, Ferguson, Law, and myself.

Ascaris lumbricoides is extremely prevalent also. Few children, native or European, escape the attentions of this parasite. It is frequently the cause of infantile convulsions.

Tricocephalus dispar is also very commonly met with. It does not appear, however, to cause any noticeable symptoms.

Anguillula intestinale is also very common, and is frequently associated with ankylostomiasis,

Oxyuris vermicularis is likewise frequently met with.

Tænia is decidedly rare, and when met with is usually so in an East Indian immigrant who has brought the infection with him from India. The *Tænia madagascariensis* has, however, been met with by Dr. Daniels in an Aboriginal Indian, and was described by him in the volume for 1895.

Sprue is occasionally met with chiefly amongst the East Indians, but it is not very common.

III. Diseases Appearing from an Examination of the Urine.

Hæmoglobinuric fever is certainly met with here, but it is by no means common. I have myself seen some two or three well-marked cases.

Bilharzia disease has so far not been recorded as occurring in British Guiana. Quite recently Sir Patrick Manson has come across a case coming from one of the West Indian Islands, so that it is quite likely the disease may be present here. I have recently had a case under observation, the symptoms of which decidedly pointed to bilharzia affection, but I was unable to detect the ova in the few specimens of urine examined by me.

Calculus is decidedly uncommon, and when it is met with is usually so amongst East Indians, who probably become affected in India. A few cases of stone extraction are on record at the Public Hospital, Georgetown, and I have recently made a *post-mortem* examination on an East Indian who died from suppurative nephritis, and from whose kidneys I removed several uric acid calculi.

IV. Diseases Appearing from an Examination of the Sputum.

Pulmonary Phthisis.—Extremely common amongst the black and East Indian population, more so amongst the blacks. Bad ventilation and overcrowding at night-time are without doubt the principal means of its spread. This is essentially a climate in which such a disease should not occur. All the year round an open-air life can be indulged in, and there are few nights during which free ventilation cannot be maintained the whole night long, and the greater number of days during the year are blessed by an almost continuous sunshine. Cases of phthisis amongst Europeans living out here invariably do well, owing to the fact that the houses occupied by Europeans are mostly, for all intents and purposes, open-air shelters.

Asthma. — Bronchial asthma is very common amongst the East Indian population, but not so amongst the blacks. The cases are usually those of a somewhat exaggerated dyspnœa accompanying chronic bronchitis and pulmonary emphysama.

Gangrene of lung is met with now and again, but is not very common.

V. Diseases Appearing from an Examination of the Skin.

Leprosy is exceedingly common here. A large Leper Asylum (an account of which, by Dr. Neale, was given in a former number of the Journal of Tropical Medicine), capable of holding some 700 patients, exists at Mahaica, about twenty-five miles from Georgetown. Salt-fish is universally adopted as a common food amongst all classes, and at times it is undoubtedly eaten when not in a fit condition. There is no compulsory segregation in this colony.

Yaws is very common in certain districts, notably the Islands of Wakenaam and along the Essequebo Coast and Pomeroon River. Syphilis is also extremely rife all over the Colony, and without doubt it is at times hard to say whether a particular case should be called syphilis or yaws (vide *Brit. Guiana Med. Annual*, 1895, paper by Dr. Daniels and Wallbridge, p. 99).

Tinea, quite common, with the exception of *Tinea tonsurans*, of which I have not yet seen a case in the colony. *Tinea imbricata* likewise does not exist here.

Keloids of very common occurrence, chiefly among the blacks, usually forming on operation scars.

Myiasis.—Fairly common, usually the larvæ of the screw-worm affecting ulcerated nares. In one case under my care recently, these larvæ were found in large numbers in the ulcerated vagina of a black woman. *Dermatobia noxialis* is also fairly commonly met with, usually about the limbs of the affected host.

Leucoderma is very common amongst the blacks, chiefly no doubt of a syphilitic nature.

Ulcerating Granuloma of the Pudenda.—A common affection amongst the blacks principally. I claim for this colony the honour of first bringing to the notice of the profession the existence of this peculiar tropical affection.

Pemphigus contagiosus of Manson undoubtedly occurs here and is usually called "glass-pox" by the natives. I have met with several cases and called attention to its existence in a previous paper.

VI. Diseases Detected by a General Examination of the Body.

Beri-Beri.—There is still some doubt as to the existence or otherwise of this disease in the Colony. In the Annual for 1902, Dr. Carter describes two cases, and Dr. Fowler, in a previous number, calls attention to the probable existence of this disease here. It may fairly be conceded that the disease is by no means common. I have seen several cases of peripheral neuritis here, but could never reconcile them with the text-book descriptions of beri-beri.

Sleeping Sickness.—I have already referred to the probability of its non-existence in British Guiana; but maintain that further researches on this subject are required.

Low fever is of fairly common occurrence. Exposure to the sun, fatigue and constipation are doubtless predisposing causes.

Malta Fever.—Not a few cases of certainly non-malarial origin occur, which undoubtedly call to mind the symptoms and course of Malta fever; but so far no one has recorded a case.

Heat Stroke.—Not very common. Some of the cases so recorded would more properly be described as cases of pernicious malarial fever.

Poisoning.—Not common. Amongst East Indians the administration of dhatura seeds now and again occurs. Chronic opium poisoning is common amongst the Chinese; and ganje poisoning is fairly common amongst East Indians. Amongst the blacks cases of

bitter cassava poisoning now and again occur; but the Negro is not given as a rule to indulging in poisons.

Alcoholic poisoning is not common amongst the native population; they allow their white brethren to give them the lead in this direction.

VII. Local Affections.

Liver Abscess.—By no means uncommon. Almost always associated with dysentery, and the *Amœba coli* can usually be found. Generally of the single large tropical variety.

Ainhum occurs amongst the blacks, but is by no means common. Cases have been described by Dr. von Winckler in a former Annual.

Goitre.—I know of no recorded case here.

Guinea-worm.—A few cases have been described, but it is decidedly rare.

Cancrum oris occurs now and again, but is by no means common.

Mycetoma undoubtedly occurs, but is not of frequent occurrence. It is usually diagnosed as a form of elephantiasis. A specimen exists, or did exist, in the Laboratory of the Public Hospital, Georgetown.

Jigger is extremely prevalent, chiefly amongst the East Indians on sugar plantations.

Ground itch is also a common affection amongst East Indians on estates. It is highly probable that this is really an ankylostome affection, caused by the embryos of ankylostomes penetrating the skin. Whether these embryos ultimately gain access to the alimentary tract is difficult to prove.

Insect Bites.—Those of mosquitoes and sandflies are, of course, extremely common.

Snake Bites.—Decidedly rare. Occasionally natives maintain they have been bitten by venomous snakes, but more often than not their statements do not hold water. The rattlesnake exists in the forests; but I have never come across nor heard of a case of bite by this snake.

Eye Troubles.—Very common. Cataracts are of frequent occurrence amongst the East Indians and rather less so amongst the Negro population. Granular lids are fairly often met with. Iritis, usually the result of syphilis, is frequent. Epidemics of catarrhal conjunctivitis occasionally occur amongst East Indians on estates.

Epidemics.

Small-pox has only recently visited us. During the last fifty years the epidemic has been of an exceedingly mild nature and with a very low mortality. It was in all probability imported here from Trinidad. Vaccination has been very vigorously carried on and but little objection offered to it by the natives.

Cholera.—Non-existent, certainly for the last fifty years.

Enteric Fever.—Very rare. Undoubted cases have been recorded and ably described by Dr. Ferguson in a former Annual.

Dengue.—Non-existent.

Plague.—No recorded cases.

Cerebro-spinal fever, when it occurs, is always in East Indian immigrants recently landed from India. I have seen one or two well-marked cases in the Public Hospital, Georgetown.

Typhus.—Not known here.

Other Diseases Common to all Climates which are Frequent in British Guiana.

Tuberculosis and *Syphilis* are extremely prevalent. The latter is often seen in exaggerated forms. It is, however, extremely rare to meet with a typical Hunterian chancre. On the other hand, phagedænic ulceration of the penis is common. Typical Hutchinson teeth are likewise of unfrequent occurrence; why this should be I am at a loss to know.

Gonorrhœa is very common; but it is with great difficulty that the native can be brought to understand that this disease is transmitted by sexual intercourse. He will always stoutly affirm that it has been brought on by a severe strain not connected with sexual indulgence.

Surgical Affections.

There is always a large field for surgery in this Colony. Herniæ and hydroceles are decidedly common. Tumours of all kinds may always be met with. To attempt to maintain that cancer is uncommon where malarial fever exists would be a hard task indeed in this colony. On the contary, cancer may be said to be as frequently met with here as in most European countries.

Correspondence.

"STANDARDISATION OF DISINFECTANTS."

TO THE EDITOR OF THE "JOURNAL OF TROPICAL MEDICINE."

Dear Sir,—Referring to a circular issued and forwarded for publication to a section of the Press, under date of 17th inst., by the Sanitas Company, Ltd., and signed by Mr. C. T. Kingzett, their chairman, we do not purpose keeping up a war of circulars with that gentleman, but it is necessary briefly to allude to this production. In stating that we admit being "delinquents" in the proceedings taken to obtain a legal Standardisation of Disinfectants, and in criticising our offer of monetary support to that object, we are driven to the conclusion that Mr. Kingzett wilfully misrepresents the obvious purport of our statement in our circular letter of September 23rd.

With regard to Mr. Kingzett's appreciation of our method of dealing with his first circular, dated September 1st, we cannot do better than quote what we wrote to his Company under date of October 6th, viz.:—

"My Board note with much surprise your remarks on our circular letter of the 23rd ult. Having regard to the text of your circular of September 1st, and to our very prominent efforts to bring about a Standardisation of Disinfectants, it was surely to be expected that we should 'obtrude ourselves' (to use your not very appropriate phraseology) into the discussion; while we can hardly believe you are serious in claiming the character and privilege of a private communication for a document stated to have been addressed to all Members of Parliament, with a view to influence their votes on possible proposed legislation, which was circulated in other directions, and forwarded for publication to, and in many instances published by, the technical press. That you find our circular, as you state you do, 'ambiguous, evasive,' and failing to deal with the 'pith' of your chairman's letter, is certainly not a conclusion we can admit as just or justified. Most of the arguments put forward appear to us not germane to the subject under discussion, and to bear their refutation on the face of them. While from our point of view it would be impertinent for us to discuss points

which are in a sense *sub judice*, until the recommendations of the distinguished Committee of the Sanitary Institute are promulgated, we do not anticipate the slightest difficulty in traversing successfully, at the right time, the views you have published."

To prove that "a while ago" we favoured chemical analysis and are inconsistent in now advocating bacteriological tests, Mr. Kingzett gives long quotations from a brochure compiled and printed some eleven years ago and which has long been out of print. It should be hardly necessary to remark that sanitary science has moved considerably in that period. It is worthy of remark that even in the absence of any standard of coefficiency the Sanitas Company has largely advertised the efficiency of their products (and shown same by tables) as bactericides against the germs of certain diseases. Why then should they so hotly dispute the efficiency of such tests when properly systematised and controlled by a standard? The remarks as to the work now in progress by the Sanitary Institute and Mr. Kingzett's opinions of same we see no reason to comment upon; and we do not purpose replying to any further contributions to this controversy which may be made by the Sanitas Company.

For Jeyes' Sanitary Compounds Co., Limited,
(*Signed*) H. H. Nelson,
Chairman.

64, *Cannon Street,*
London, E.C.,
October 27th, 1904.

Notes and News.

A prize of 100 rupees will be given for the best Essay on the Etiology, Prevention, Clinical History, Pathology and Treatment of Dysentery, by the proprietors of the *Indian Medical Gazette*, Messrs. Thacker and Spink, of Calcutta. The articles have to be sent in before June, 1905.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Bilharziasis.

Sandwith, F. M. *Practitioner*, October, 1904.—In an excellent article in the *Practitioner*, Dr. Sandwith deals fully with the disease bilharziasis and gives the geographical distribution as follows:—

In *Europe* the disease is nowhere endemic, but individuals often bring it home with them from Egypt, South Africa, and other places. In *Asia* it has been reported from Mecca, the Hedjaz, Arabia, Syria, Mesopotamia, in the valleys of the Tigris and Euphrates; Persia, and the west coast of India. It is also suspected to exist in Canton and Siam, where there are large rivers, because of the frequency of calculi among the natives. It is known in *Mauritius*, and one case has lately been reported from *America* (Illinois), and another from the *West Indies*.

But it is in *Africa* that it is best known and most widely distributed. In Lower Egypt the worm is found in at least one-third of all the autopsies; and in 1901 (an average year) there were treated at the Kasr-el-Ainy Hospital 930 cases, most of which came from Lower Egypt. In the Soudan it is common amongst imported Egyptians, but it was thought not to be endemic until Dr. Balfour recently found it in three boys who had never been out of the Soudan. Sporadic cases have been reported in Arabs from Kassala, Darfur and Kordofan, and the disease is endemic in Tunis and Algiers. On the west coast it is known in Nigeria, the German Cameroons and Angola; and on the east coast all the way from Egypt to the Cape, including Zanzibar and Abyssinia. In Central Africa it is endemic in Uganda, British Central Africa and the Congo State; while in South Africa it is well known in Delagoa Bay, Port Elizabeth, Natal, Bloemfontein, the Transvaal and Kaffraria. The disease is less serious in South Africa than in Egypt.

Bilharzia Hæmatobia in India.

Sewell, E. P. *Journal of the Royal Army Medical Corps*, November, 1904.—Sewell, writing from Mian Mir, Punjab, describes a case of bilharzia in a British soldier who had never been in Egypt or South Africa. Other cases of the disease came under his notice, but the men had all been in South Africa. There seems to have been no contact between these patients. Owing to the rarity of bilharzia in India the observation is interesting.

Congo Floor Maggot.

Austen, E. E. *Journal of the Royal Army Medical Corps*, November, 1904.—Austen states that the flies and larvæ brought by Dr. Cuthbert Christy from the Congo and known as the Congo floor maggot, and flies which he has received from Uganda, bred from larvæ in the laboratory at Entebbe, all belong to the same species—the *Auchmeromyia luteola*, Fabr., which is very widely distributed in Africa and ranges from Nigeria to Natal. It is possible that the parasite may be both a bloodsucker and at times a subcutaneous parasite.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

Bilharzia Hæmatobia—Treatment by Chrysoidine.

Ensor, H., in a letter to the *Journal of the Royal Army Medical Corps*, of November, 1904, has been trying doses of $\frac{1}{6}$ grain of chrysoidine, in the form of pills, administered thrice daily, and continued until the urine becomes a bright yellow. The ova of the bilharzia in the urine show crenated edges when taking the drug, and considerable benefit seemed to follow its use.

Dysentery—Treatment by Izal.

Vaughan, J. C. S. *Indian Medical Gazette*, October, 1904.—Major Vaughan, I.M.S., has been investigating the treatment of tropical dysentery by Izal in India.

He found the dose of 3 minims of Izal quite ineffectual, and increased the dose to 15 minims, and even 26¼ minims of the medical emulsion. The doses were given, on an average, six or seven times daily. The drug may be given in milk or in a mixture with chloric ether, compound tincture of cardamoms and glycerine diluted with water. Vaughan has found Izal, in both mild and severe types of dysentery, a most reliable remedy.

Malaria—Treatment by Adrenalin Chloride and Normal Saline Solution.

PILLAI, in the *Indian Medical Gazette*, of August, 1904, states he treated a severe case of malarial anæmia in the Andamans by various methods without success, from July 27th to August 13th. On the latter date 20 grains of chloride of calcium were given in milk: 16 oz. of normal saline solution (5 per cent. of sodium chloride) were injected subcutaneously, and 10 minims of adrenalin chloride (1 to 10,000) every fourth hour in an ounce of water by the mouth. This *régimé* was followed from August 13th to August 17th with marked benefit, as tested by the blood count and by the general appearance of the patient. After August 17th these remedies were stopped, and ordinary tonics administered, until the patient was restored to health.

Parangi (Yaws), Bacteriology of.

MODDER, E. E. *Indian Medical Gazette*, August, 1904.—The parangi of Ceylon, the yaws of the West Indies, and the frambœsia of Brazil seem identical diseases. Dr. Modder has succeeded in cultivating a micrococcus in neutral gelatine up to the third generation. The growth was rendered diffluent on the surface, and afterwards formed a greyish film. In sterilised broth the growth became turbid and the cocci well-marked. As the micrococcus grows only in acid media, Modder was induced to try treatment by alkalies, and administered 20 grains of sodii bicarb., thrice daily, and employed a lotion of 10 grains to 1 oz. locally. This treatment was successful in several cases.

Piroplasma Bigeminum and Piroplasma Parvum.

THEILER, A. *Journal of the Royal Army Medical Corps*, November, 1904.—In a carefully prepared article, Dr. Theiler, of Pretoria, discusses the two varieties of piroplasma present in animals. The *Piroplasma bigeminum* was first described as the cause of "Texas fever" in cattle, and it was believed that this species was the origin of "Rhodesian redwater," of "Rhodesian tick fever," of "East Coast fever" and of the disease observed by Dschmikowsky and Luhs in Transcaucasia and termed tropical piroplasmosis. It now appears, however, that there are two diseases and two species of parasites; the larger parasite being the *P. bigeminum* and the smaller the *P. parvum* (new species). The disease caused by the latter runs a different course to "Texas fever" and cattle that are immune against "Texas fever" (*P. bigeminum*) are not immune against the new malady (*P. parvum*). In addition, the tropical piroplasmosis could not be inoculated into susceptible cattle even with large quantities of blood containing the small piroplasma (*P. parvum*) in great numbers. This fact clearly differentiates the two diseases, since Texas fever is easily inoculable into susceptible cattle.

The *Piroplasma parvum* appears either in the form of a small sphere, or as a rod (bacillary form). When stained with any of Romanowsky's methods (as, for instance, Laveran, Azur II., or MacConkey's) the sphere takes the shape of a ring; the karyosoma being visible on one side of the sphere, the margin slightly blue, and the centre usually colourless or only slightly tinged. The rod is inflated at one end, and herein lies the karyosome. The rod-shaped parasites may be straight or curved. The rings are round, oval-shaped, or oblong, and one can also find forms which indicate intermediate stages between these rings and rods. After the death of the animal the *Piroplasma parvum* takes the ring form.

These parasites are found towards the end of the disease in enormous numbers, investing from 30 per cent. to 90 per cent. of all red corpuscles, and several may be counted in the same blood cell.

CONCLUSIONS FROM A SERIES OF OBSERVATIONS.

(1) The injection of blood into a susceptible animal, taken from an ox immune against ordinary redwater or Texas fever, usually gives rise to a primary and a secondary reaction, during which period the typical pear-shaped *Piroplasma bigeminum* makes its appearance.

(2) Either with the second reaction or shortly afterwards endoglobular parasites appear in the shape of rings and rods, which resemble the *Piroplasma parvum* of East Coast fever.

(3) These rings and rods are seen in the majority of all cattle living in a redwater-infected area and which at one time or another have been injected with blood of cattle immune against redwater.

(4) The presence of the rings and rods in the blood of an ox proves immunity against redwater.

(5) When rings are observed in cattle injected with blood of cattle suffering from or immune against East Coast fever, then they are due to the simultaneous injection of immune blood of ordinary redwater. At the present time, East Coast fever exists only in redwater infected areas, where the cattle are immune against redwater.

(6) The presence of rings does not indicate that an animal is immune against East Coast fever.

(7) The rings and rods may, under certain conditions, multiply and increase in numbers.

(8) The rings and rods represent a phase in the life-history of *Piroplasma bigeminum* in the immune ox.

Plague.

TREATMENT BY CARBOLIC ACID.

HIDAYATULLAH, M. *Indian Medical Gazette*, August, 1904.—At Jhelam in India 12-grain doses of carbolic acid were given every two hours in plague with marked benefit. The acid was dissolved in water and sweetened with syrup of sandal-wood, and coloured with tincture of cardamoms. The temperature came down in favourable cases within forty-eight hours. Success was noticed in bubonic cases of the disease only.

Sleeping Sickness.

CASTELLANI, A. *Journal of the Ceylon Branch of the British Medical Association*, January to June,

1904.—Dr. Aldo Castellani, Director of the Bacteriological Institute, Colombo, Ceylon, who first discovered the trypanosomal origin of sleeping sickness, gives a succinct account of the disease, its history, geographical distribution, and clinical features.

At the beginning of last century missionaries returning from the West Coast of Africa used to speak of a curious disease called by the natives "*ntansi*," which means to sleep. The first scientific description was given by Winterbottom. Later on the disease was studied by Dumontier, Santelli and Corre. In 1891 Mackenzie published the record of a case which was under his care in the London Hospital; and in 1900 Manson gave a very complete description of two cases sent to London from the Congo. The pathology of these two cases was thoroughly worked out by Mott, who was the first to point out that the lesions found were of the nature of a meningo-encephalitis. Lately much attention has been paid to the disease by Marchaux, Le Dantec, Broden, Cook, Hodges, Moffat, the members of the Portuguese Commission, and quite recently by the first and second Commissions sent out by the Foreign Office and Royal Society in 1902 and 1903. Very important are also the researches of Brumpt and Blanchard.

Until a few years ago sleeping sickness was limited to some parts of West Africa and a few districts of the Congo. Lately it has begun to spread very widely up the Niger and the Congo, and has suddenly appeared in East Central Africa. Its ravages in Uganda have been appalling. Sleeping sickness has been looked upon as a disease of the Negro race exclusively, but Manson and Low have proved that it may occur also in Europeans.

Etiology.—The disease has been considered by some old authors to be a peculiar kind of malaria, a variety of beri-beri, an intoxication, a form of sunstroke. According to Le Dantec the disease is due to the *Anguillula intestinale*, according to Ferguson to the *Ankylostoma duodenale*. Manson suggested that *Filaria perstans* might be the cause of the disease. There is no doubt that this theory had many points in its favour, especially as it explained the long incubation period, but the epidemiological researches of Low and Christy have demonstrated that *Filaria perstans* cannot be the direct cause of the disease. Many observers favour a bacterial origin, and different forms of germs have been described by Cagigal and Lepierre, Marchaux, Broden. The members of the Portuguese Commission believe to have found the cause of sleeping sickness in a diplo-streptococcus, called by them hypnococcus. According to my experience there cannot be any doubt that in a number of cases of sleeping sickness a streptococcus infection is frequently present in the very last stage of the malady, but I have come to the conclusion that this streptococcus infection is simply a secondary one. The real cause of sleeping sickness, in my opinion, is the trypanosome. Since November, 1902, when I began to use a special technique for the examination of the cerebro-spinal fluid, I frequently observed in it a trypanosome. To obtain good results one must adopt the following technique: By means of lumbar puncture one drains off at least 15 cm. of the cerebro-spinal fluid. It is better to reject the first few cm., as they are apt to contain blood. When the fluid comes away clear 10 cc. are collected and centrifuged for fifteen minutes. At the end of this time there is found at the bottom of the tube a slight deposit of whitish sediment, and in some cases also a minute trace of blood. The liquid above the sediment is poured off and the sediment examined under a moderately low power of the microscope. As the trypanosomes are at first fairly active they are easily detected. Of thirty-four cases of sleeping sickness examined I found trypanosomes in the cerebro-spinal fluid during life in twenty, giving a rate of a little less than 70 per cent.

On two occasions I also examined in the same way fluid obtained *post mortem* from the lateral ventricles, and in both cases found the same parasites. In the blood among the few cases tested for this purpose I found the trypanosomes once with certainty. In the blood as well as in the cerebro-spinal fluid I have observed several times peculiar bodies which I considered developmental stages of the trypanosome.

In twelve cases of ordinary disease the cerebro-spinal fluid was taken during life by lumbar puncture, but in no case did it contain trypanosomes. My results have been amply confirmed by Blanchard, Bruce, Brumpt, Nabarro, &c. Sambon, as soon as he knew of my results, started the hypothesis that the trypanosomes of sleeping sickness might be carried by the *Glossina palpalis*, a species of tsetse-fly. This hypothesis has been proved to be right by the very important experiments of Bruce, Nabarro and Brumpt.

Clinical Features of Sleeping Sickness.—I have based the following brief description of the disease on the observations of Low and myself, published in the *Reports of the Royal Society*, No. 2, page 14: Sleeping sickness presents three stages. In the first there are not very characteristic symptoms; only a slight change in the former mental attitude of the patient, and an apparent disinclination to work may be noticed. A sympton, the importance of which in the early diagnosis of the disease was first pointed out by Low and myself, is the presence of fever. The temperature shows very frequently an intermittent type, reaching in the evening 101° to 102°, falling to subnormal in the morning. The pulse is generally of very low tension and frequent, the number of beats varying from 90 to 130 per minute.

The second period might be called, from the most characteristic feature, a period of tremor. The tremor is best seen in the tongue and in the hands. It is in this stage that the patient shows the characteristic heavy, stupid look, and sometimes drowsiness. The patient complains of headache and vague pains all over the body. There is slowness in answering questions, and when speech does come it is often mumbling and thick. Sometimes he sits down, his eyes closed, and he remains in this drowsy condition until again asked some questions. The gait is best expressed by the term shuffling. In this stage, as well as in the first, the spleen is enlarged. Several lymphatic glands also may be enlarged. It is difficult to say whether this enlargement of spleen and glands is to be considered a feature of sleeping sickness or not; Low and myself have noticed a similar enlargement in many natives apparently in good health. In the second and

third stage of the disease anæmia in varying amount is constant. The number of the large mononuclear leucocytes is increased.

In the third period, which lasts only two to four weeks, the pyrexia is no more present, the temperature is often subnormal; emaciation and general weakness become pronounced; the knee reflexes, which were at first somewhat exaggerated, become diminished; the motions are passed involuntarily in bed. Saliva often dribbles from the mouth. Drowsiness gradually deepens and the patient can only be roused with difficulty. The patient dies generally in a complete state of coma.

Pathological Anatomy.—Macroscopically there is practically nothing to be noted, with the exception that the pia-arachnoid is slightly opaque and the cerebro-spinal fluid is in some cases increased. Microscopically the most characteristic feature is a perivascular infiltration of mononuclear leucocytes in the brain, as shown by Mott and Low. The leucocytic formula of the cerebro-spinal fluid is also mononuclear.

Diagnosis.—The diagnosis in some instances may be exceedingly difficult, especially in early cases. In such cases the simplest way to arrive at a diagnosis is to perform lumbar puncture and examine the cerebrospinal fluid for trypanosomes by the method already described.

Prognosis.—The disease always terminates fatally. All the cases in our hospital in Entebbe died, and we were never able to satisfy ourselves as to rumours of people recovering.

Cure and Prevention.—All sorts of drugs have been tried. So far no reliable treatment has been found. As regards prevention, this may be attained by avoiding the bite of the *Glossina palpalis.* Our efforts should tend to destroy this fly. The jungles near the native villages, where these flies are met with in swarms, should be cleared. The fly-zones should be avoided in building new villages and European settlements.

These are the most practical means to prevent sleeping sickness. Another means would be to try, with all due prudence and after complete laboratory researches, the immunisation of natives who have not yet caught the disease.

Koch, Laveran, Mesnil, Rabinowitsh, Kempner and others have tried immunisation against various forms of trypanosomiasis in the lower animals, in some cases with fairly good results, though never very brilliant. The principle is to pass a strain of trypanosome through different races of animals until it loses a certain degree of its virulence. Koch made the following experiment: He took some blood from an ox affected with nagana and inoculated a rat with it. The rat died. With this blood a dog was inoculated; he also died. With the blood of the dog Koch inoculated some other dogs, some rats and two calves. The dogs and rats died. The two calves were ill for a certain time, showing trypanosomes in their blood; but after a time they recovered and were immune against any new inoculation of infected blood.

Following the same principle, the trypanosomes of sleeping sickness might be passed through many species of animals until it had lost most of its virulence. Then one should try to immunise monkeys; and if the results were good the immunisation might be tried on human beings also.

Yellow Fever, Prophylaxis of.

Bessawitz, E. V. *Munchener Medizinische Wochenschrift*, July 10, 1904.—In addition to destruction of mosquitoes, isolation of the infected and protection of healthy persons by netting, Bessawitz states that the ordinary insect powder (flor. pyreth.) when rubbed in the skin serves to keep insects away. He suggests searching for and extracting the essential oil of this powder and using it to rub on the skin in mosquito-infected districts.

Literary References.

TROPICAL DISEASES.

TRYPANOSOMIASIS.

Bertarelli, E. Le recenti scoperte intorno di tripanosomi, *Riv. d'ig. e san. pubb.*, Torino, 1904, vol. xv., p. 361.

Broden, A. Ueber einige Fälle von Infektion mit Trypanosomen am Congo, an Menschen und Tieren beobachtet, *Ztschr. f. ang. Mikr.*, Leipzig, 1904, vol. x., p. 35.

Brumpt, E. La maladie désignée sous le nom d'aïno par les Somalis de l'Ogaden est une trypanosomose probablement identique au nagana de l'Afrique orientale, *Compt. rend. Soc. de biol.*, Paris, 1904, vol. lvi., p. 673.

Sur une nouvelle espèce de mouche tsé-tsé, la Glossina Decorsei, n. sp., provenant de l'Afrique centrale, *Compt. rend. Soc. de biol.*, Paris, 1904, vol. lvi., p. 628.

Carini, A. Die pathogenen Trypanosomen des Menschen und der Tiere, *Cor.-Bl. f. schweiz. Aerzte*, Basel, 1904, vol. xxxiv., p. 392.

Cazabou. Note sur la maladie du dromadaire dite mbori et la présence d'un trypanosome dans le sang, *Rev. d. troupes colon*, Paris, 1904, vol. iii., p. 192.

Cazalbou. 1°, Mbori expérimentale; 2°, Note sur la soumaya (Rap. de Laveran), *Bull. Acad. de méd.*, Paris, 1904, 3 s., vol. li., p. 348.

Chichester, C. R. Arsenic in the Treatment of Trypanosomiasis in Cattle in Nigeria, Journ. Trop. Med., London, 1904, vol. vii., p. 196.

Dimmock, H. P. Trypanosomiasis, *Indian Med. Gaz.*, Calcutta, 1904, vol. xxxix., p. 176.

Ehrlich, P., and **Shiga, K.** Farbentherapeutische Versuche bei Trypanosomenerkrankung, *Berl. klin. Wchnschr.*, 1904, vol. xli., pp. 329, 362.

Günther and **Weber.** Ein Fall von Trypanosomenkrankheit beim Menschen, *München med. Wchnschr.*, 1904, vol. li., p. 1044.

Keysselitz, G. Ueber Trypanophis Grobbeni (Trypanosoma Grobbeni, Poche), *Arch. f. Protistenk.*, Jena, 1904, vol. iii., p. 367.

Kilbourne, E. D. Some Experiments with the Trypanosoma Evansi, *Journ. Ass. Mil. Surg. U.S.*, Carlisle, Pa., 1904, vol. xiv., p. 248.

Laveran, A. Action du sérum humain sur quelques trypanosomes pathogènes; action d. l'acide arsénieux sur Tr. Gambiense, *Compt. rend. Acad. d. sc.*, Paris, 1904, vol. cxxxviii., p. 450.

Immunité naturelle des cynocéphales pour les trypanosomiases, activité de leur sérum sur les trypanosomes, *Compt. rend. Acad. d. sc.*, Paris, 1904, vol. cxxxix., p. 177.

Le trypanroth dans le traitement de quelques trypanosomiases, *Compt. rend. Acad. d. sc.*, Paris, 1904, vol. cxxxix., p. 19.

Observations au sujet du rapport de M. R. Blanchard sur un travail de M. Brumpt, *Bull. Acad. de méd.*, Paris, 1904, 3 s., vol. li., p. 523.

Sur l'agent pathogène de la trypanosomiase humaine, Tr. gambiense, Dutton, *Compt. rend. Acad. d. sc.*, Paris, 1904, vol. cxxxviii., p. 841.

Sur l'existence d'une trypanosomiase des équidés dans la Guinée française, *Compt. rend. Soc. de biol.*, Paris, 1904, vol. lvi., p. 326.

Laveran, A. The Action of Human Serum upon some Pathogenic Trypanosomes and the Action of Arsenious Acid on Trypanosoma Gambiense, *Journ. Roy. Army Med. Corps*, London, 1904, vol. iii., p. 93.

Laveran, A, and **Mesnil, F.** Sur un trypanosome d'Afrique pathogène pour les équidés, Tr. dimorphon, Dutton et Todd, *Compt. rend. Acad. d. sc.*, Paris, 1904, vol. cxxxviii., p. 732.

Trypanosomes et trypanosomiases. Paris [1904], Masson et Cie, 418 pp., 1 pl., 8vo.

Leger, L. Sur la morphologie du trypanoplasma des vairons, *Compt. rend. Acad. d. sc.*, Paris, 1904, vol. cxxxviii., p. 824.

Martini, E. Vergleichende Beobachtungen über Bau und Entwickelung der Tsetse-und Rattentrypanosomen, *Festschr. z. 60. Geburtst. v. Robert Koch*, Jena, 1903, p. 219, 2 pls.

Montel. Épizootie de surra, à Hatien, *Ann. d'hyg. et de méd. colon.*, Paris, 1904, vol. vii., p. 219.

Moore, E. J. On the Beneficial Effects of Sodium Arseniate Employed Hypodermically in Tsetse-fly Disease in Cattle, *Lancet*, London, 1904, vol. ii., p. 15.

Musgrave, W. E., and **Clegg, M. T.** Report on Trypanosoma and Trypanosomiasis, with Special Reference to Suna, in the Philippine Islands, *Rep. Superintend. Govt. Laborat. Philippine Isl.*, 1903, Washington, 1904, p. 419, 24 pl.

Navarre, P. J. Maladies à trypanosomes de l'homme, *Lyon méd.*, 1904, vol. cii., p. 514.

Novy, B. J., and **MacNeal, W. Y.** O trypanosomiasis a kultivaci mikroorganismu zvírecích, obzvláste trypansoma Lewisi [. . . and the cultivation of the microorganisms of animals, especially the . . .], *Casop. lék. cesk*, v. Praze, 1904, vol. xliii., p. 371.

Novy, F. G., **McNeal, W. J.**, and **Hare, C. B.** The Cultivation of the Surra Trypanosome of the Philippines, *Journ. Amer. Med. Assoc.*, Chicago, 1904, vol. xlii., p. 1413.

Panse, O. Trypanosoma Theileri (?) in Deutsch-Ostafrika, *Ztschr. f. Hyg. u. Infektionskrankh.*, Leipzig, 1904, vol. xlvi., p. 376.

Pease, H. T. Surra and Dourine, *Vet. J.*, London, 1904, n. s., vol. ix., p. 187.

Perkins, R. G. Trypanosomiasis, *Cleveland M. J.*, 1904, vol. iii., p. 304.

Rennes. Contribution à l'étude d'une trypanosomose Nord-Africaine, *Bull. Soc. centr. de méd. vet.*, Paris, 1904, vol. lviii., p. 248.

Rogers, L. Preliminary Note on the Development of Trypanosoma in Cultures of the Cunningham-Leishman-Donovan Bodies of Cachexial Fever and Kala-azar, *Lancet*, London, 1904, vol. ii., p. 215.

Ross, R. Trypanosomes and the Leishman-Donovan Bodies, *Brit. Med. Journ.*, London, 1904, vol. ii., p. 98.

Ruata, G. R. La tripanosomiasi nell' uomo, *Riforma med.*, Palermo-Napoli, 1904, vol. xx., p. 400.

Sergent, Ed., and **Sergent, Et.** Seconde note sur une trypanosomiase des dromedaires d'Algéria, *Compt. rend. Soc. de Biol.*, Paris, 1904, vol. lvi., p. 914.

Schoo, H. J. M. Piroplasmen en trypanosomen bij mensch. en dier, *Geeneesk. Bl. u. Klin. en Lab. v. de prakt.*, Haarlem, 1904, vol. xi., p. 29, 2 pls.

Trypanosomen, *Nederl. Tijdschr. v. Geneesk.*, Amsterdam, 1904, 2 R., vol. xl., d. 1, p. 716.

Stähelin, R. Ueber Stoffwechsel und Energieverbrauch bei der Surraerkrankung, *Arch. f. Hyg.*, München and Berlin, 1904, vol. l., p. 77.

Thiroux. Sur un nouveau trypanosome des oiseaux, *Compt. rend. Acad. d. sc.*, Paris, 1904, vol. cxxxix., p. 145.

Thomas, H. W., and **Linton, S. F.** A Comparison of the Animal Reactions of the Trypanosomes of Uganda and Congo Free State Sleeping Sickness with those of Trypanosoma Gambiense (Dutton), *Lancet*, London, 1904, vol. i., p. 1337.

Yakimoff, V. L. K. biologii tripanozom Nagan 'i i mal de Caderas, *Vestnik obsh. vet.*, St. Petersburg, 1904, vol. xvi., p. 538.

Sleeping Sickness.

Adams, A. M. Trypanosomiasis and Morbus Dormitiva, *Brit. Med. Journ.*, London, 1904, vol. i., p. 889.

Aureggio, E. Maladies à trypanosomes des animaux (à propos de la maladie du sommeil de l'homme), *Lyon méd.*, 1904, vol. cii., p. 442, 496.

Brault, J. Hypnosie, maladie à trypanosomes, *Ann. Soc. de méd. de Gand.*, 1904, vol. lxxiii., p. 33.

Bruce, D. Sleeping Sickness in Uganda, *Journ. Roy. Army Med. Corps*, London, 1904, vol. iii., p. 17, 4 pl., 2 maps.

Brumpt and **Wurtz.** Maladie du sommeil expérimentale chez les souris, rats, cobayes, lapins, marmottes et hérissons; chez les singes d'Amérique, les makis de Madagascar, le chien et le porc, *Compt. rend. Soc. de biol.*, Paris, 1904, vol. lvi., p. 567.

Cannac. Un cas de maladie du sommeil (observé à la Côte d'Ivoire), *Arch. de méd. nav.*, Paris, 1904, vol. lxxxi., p. 97.

Castellani, A. Sleeping Sickness, *Brit. Med. Journ.*, London, 1904, vol ii., p. 71.

Correia Mendes. Caso de doença do somno n'um branco, *Med. contemp.*, Lisbon, 1904, 2 s., vol. vi., p. 152.

Dupont, H. Contribution à l'étude de la maladie du sommeil, *Caducée*, Paris, 1904, vol. iv., p. 103.

Gerrard, P. N. Malarial Sleeping Sickness, *Dublin J. M. Sc.*, 1904, vol. cxvii., p. 275.

Greig, E. D. W., and **Gray, A. C. H.** Note on the Lymphatic Glands in Sleeping Sickness, *Proc. Roy. Soc.*, London, 1904, vol. lxxiii., p. 455.

Note on the Lymphatic Glands in Sleeping Sickness, *Brit. Med. Journ.*, London, 1904, vol. i., p. 1253; also *Lancet*, London, 1904, vol. i., p. 1570.

Harford, C. F. Sleeping Sickness and its Cause, *Climate*, London, 1903-4, vol. v., p. 52.

Hintze, K. Die Schlafkrankheit in Togo, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1904, vol. xxx., pp. 776, 821.

Hodges, A. D. P. Sleeping Sickness: a Résumé, *Lancet*, London, 1904, vol. ii., p. 290.

Jarvis, C. Sleeping Sickness, *Internat. Clin.*, Paris, 1904, 14 s., vol. ii., p. 37.

Jones, R. The Trypanosoma of Sleeping Sickness, *Journ. Ment. Sc.*, London, 1904, vol. l., p. 262.

Kermorgant, A. Relation d'une enquête relative à la maladie du sommeil dans le gouvernement général de l'Afrique Occidentale Française, *Ann. d'hyg. et de méd. colon.*, Paris, 1904, vol. vii., p. 274, 1 pl.

Low, G. C., and **Mott, F. W.** The Examination of the Tissues of the Case of Sleeping Sickness in a European, *Brit. Med, Journ.*, London, 1904, vol. i., p. 1000, 2 pls. on 1 l.

Nicolas, A. La maladie du sommeil; les trypanosomes; la tsé-tsé, *Méd. anecdot.*, Paris, 1904, p. 59.

Polliot, H. La maladie du sommeil (Abstr.), *Ann. med. chir. du centre*, Tours, 1904, vol. iv., p. 195.

Original Communications.

NOTES ON SOME COLLECTIONS OF MOSQUITOES, &c., RECEIVED FROM THE PHILIPPINE ISLANDS AND ANGOLA;

WITH SOME INCIDENTAL REMARKS UPON CLASSIFICATION.

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DURING the last few months, I have received for identification from correspondents, a number of specimens which have afforded useful additions to our knowledge of the mosquito fauna of the localities from which they are derived. These collections, I am sorry to say, include several new forms, as the number of species now recorded is so large that additions to their number are by no means welcome.

It may be hoped that in the future, as our knowledge of details of scale structure and of larval forms increases, that many of these differently coloured forms may resolve themselves into varieties of single species; but at present, for purposes of identification, we are reduced to describing accurately each form that presents itself, with the reservation that they may or may not be "good" species.

The first collection to be noted is a rather large one sent by First Lieut. and Assist.-Surgeon Eugene R. Whitmore, of the U.S. Army, from Camp Stolsenburg, Pamp., Philippine Islands. Having no insect pins, Lieut. Whitmore sent the specimens packed in short glass tubes, tied up in muslin, after the alternative plan to pinning suggested in my "Handbook of the Mosquitoes," and it is interesting to note that, especially in the case of such as fitted their tubes closely, the specimens arrived in excellent condition for examination and description; but even in the exceptionally skilled hands of Mr. E. E. Austen, of the British Museum, they proved extremely difficult to mount as museum specimens, and hence it is to be feared that the "types" leave much to be desired.

The collection was sorted into forty-three boxes by Lieut. Whitmore, and his remarkable accuracy of observation and acuteness as a naturalist is evidenced by the fact that, save in the case of certain very variable species, there was no case of confusion of forms or duplication in the lettering.

The following is a list of the species included in this collection:—

SUBFAMILY ANOPHELINÆ.

Myzomyia Rossii (Giles). "Taken in the quarters."

Pyretophorus Philippinensis (Ludlow). "Taken in the woods and also round the quarters."

Pyretophorus Pitchfordi, Giles. Previously recorded from Zululand. "Taken in the woods and round the quarters. The commonest of the *Anophelinæ*."

Pyretophorus mininius, Theob. "Caught in the woods and quarters."

Myzorhynchus Sinensis (Wied). "Caught in the woods and quarters."

CULICINÆ.

Mansonia Australiensis, Theob. "Caught in quarters. First specimens taken about the middle of August."

Mansonia annulifera (Walker). "A common mosquito in quarters and in the woods."

Finlayia, Theobald. This genus has been differentiated since the issue of the second edition of my "Handbook of the Gnats or Mosquitoes," and may be said to stand between *Mansonia* and *Tæniorhynchus*, though I am by no means satisfied that there is any real necessity for separating it from the former genus. The scales of the wing are certainly smaller than in Mansonia, but on parts of the venation always, and in some species throughout, the scales are of the typical asymmetrical "bracket" form, characteristic of that genus. In certain species the scales of parts of the venation are distinctly those of *Tæniorhynchus*, but this combination is found also in certain *Mansoniæ*, notably in *M. titillans* (Walker).

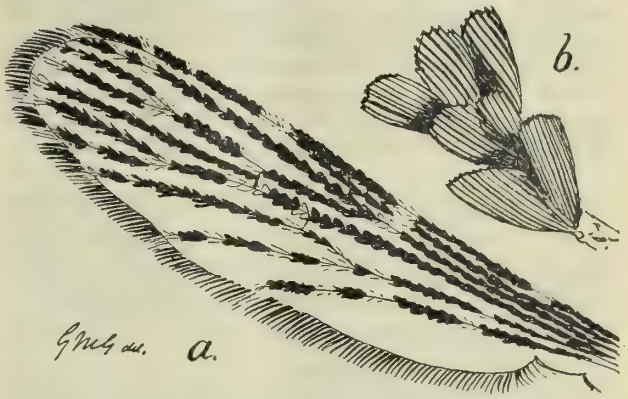


FIG. 1.—Wing of *Finlaya poialia*, Theob. (*a*) Drawing of wing, showing dark and light markings; (*b*) scales of veins more highly magnified.

Up to the appearance of the new species described below as *F. melanoptera*, it might have been said that all of the group were spotted-winged Culicines, but in that species the wing is not even brindled with scales of mixed colours. The character relied upon by Mr. Theobald in founding this genus was the possession of certain peculiar erect tufts of scales on the hinder borders of the abdominal sterna, which in typical species stand out so that in profile they look like the false feet of certain larvæ. These, however, are not always present.

It may be remembered that when the writer's description of "*Mansonia*" *anopheloides* appeared in this Journal, Mr. Theobald contributed to a subsequent issue the remark that the species was not a Mansonia, but belonged to his new genus *Finlaya*, which rather puzzled me, as I had not noticed anything peculiar in the venter of the specimen, and on re-examining it I find that, as a matter of fact, it shows nothing comparable to the ventral tufts of typical species. The same fact, too, has clearly been since noticed by Mr. Theobald, as I find that, in the Museum collection, he has now placed it with an allied species in another new genus, *Orthopodomyia*. Now the species of *Finlaya* and this last new genus resemble each other so closely in all but the possession of these queer abdominal tufts, that I cannot but think that any differences that may exist between them are in no sense of generic value. Personally, I should prefer to retain the whole group within *Mansonia*, which, as yet, is far from being an overburdened genus; but if *Finlaya* be retained—and there is no doubt that a certain generic likeness runs through the little group—some character should undoubtedly be chosen which may embrace the two species of this quite superfluous new genus *Orthopodomyia*, and this character may be found in the fact that, in all the group, the last three

abdominal segments in the female are disproportionately slender, combined with the fact that the characters of the wing-scales are intermediate between *Mansonia* and *Tæniorhynchus*.

It is probable that if this were done, certain *Mansoniæ*, such as *M. titillans*, would have to be shifted to *Finlaya*; but I have not as yet made any sufficiently close examination of the former genus to offer any definite suggestions on the point. It is an interesting fact that no less than three species of the genus are included in the present collection, two of which are new; and in view of the increasing number of species coming to hand, and including the members of the superfluous genus *Orthopodomyia*, it may be well to furnish a tabulation of the forms at present known.

GENUS FINLAYIA, THEOB.

Modified Definition.—Culicine mosquitoes, with the last two or three abdominal segments of the ♀ disproportionately slender; hinder borders of the abdominal sterna always densely scaled, and usually with remarkably long vertical tufts. Scales of head and body much as in *Culex*; those of the wing more or less combine the characters of *Mansonia* and *Tæniorhynchus*.

A. Species with prominent ventral scale tufts (= *Finlayia*, Theob.).

a. With the wings unspotted.

1. *F. melanoptera, sp. n.* A very dark species, with the feet dark but for some minute articular banding on proximal tarsal joints; abdomen unbanded.

b. With the wings spotted in contrasted colours.

2. *F. poialia*, Theob. Several abdominal segments with transverse rows of three apical dots. Wing with four fairly equally-spaced small costal pale spots and a basal dot.
3. *F. Kochii*, Theob. Abdomen brown, rather irregularly marbled with white, the ground tint sharing in the ornament. Wing with the costa dark, with an apical and two large costal spots, the inner of which is partially subdivided by a pale spot on I. Base pale, with a black dot.
4. *F. flavipennis, sp. n.* Abdomen uniformly ferruginous seen from above. Sides of terga with narrow shaped apical spots in female, and dark L-shaped lines in the male. Wing generally yellow, especially on the costa, which is mainly pale, marked with a broad but subdivided dark spot; opposite forking of V, and with minute pale interruptions of the other veins.

B. Sterna of abdominal segments without prominent tufts (= *Orthopodomyia*. Theob.).

a. With the wings spotted in contrasted colours.

5. *F. anopheloides* (Giles). Abdominal segments of ♀ black, with narrow snowy basal bands, and on some of the under segments a pair of apical white dots; in the male, all black save for a white spot on apical segments. Wings black at apex, golden-yellow at base; costa black, with five narrow snowy interruptions. Last hind tarsal and apex of next white.
6. *F. albipes* (Theob.), MS. name. Much resembles *F. anopheloides*, but the middle pale spots extend further across the wing. The outer fourth of proboscis is pale, with a minute black band, and the last *three hind tarsal-joints are entirely white.*

The above may serve to identify the species at present known, but the preferable course would be to include them in a general tabulation of *Mansonia*, as the practice of making new genera on some small peculiarity that results in the formation of genera including perhaps but a single species is much to be deprecated; for the object of forming genera is to group together, and not to separate species. If any one could suggest some character that would subdivide the still unweildy genus *Culex* into smaller groups we should all, I am sure, be sincerely grateful; but of small genera we have already an inconveniently large number, and except in the case of really startling structural characters, it appears time to call a halt to their formation.

There is, for example, among the accessions to the British Museum collection, since last I visited it, a species to which the MS. (?) name of *Lophomyia Asiatica* has been given by Mr. Theobald. There is nothing in his definition of *Nyssorhynchus* to prevent the inclusion of this species, as there are flat-scaled patches on the hinder part of the abdomen, though the forepart is mainly hairy; but it has the *specific* peculiarity of having the hind tibio-tarsal articulation furnished with a paddle-shaped tuft of long scales. The selection of the word λόφος (a crest or mane) suggests, it is true, that the preponderance of erect forked scales on the head may have something to say in the generic character, but the head in *Nyssorhynchus* also has no median flat scales. Let us hope that the genus *Lophomyia* will not reach further than the MS. stage, as one-species genera are neither more nor less than stumbling blocks to identification.

For similar reasons the genera *Eretmapodites* and *Armigeres* should undoubtedy sink, and return to their natural home in *Janthinosoma* and *Stegomyia* respectively, as, apart from their superfluity, their existence constitutes a most inconvenient obstacle to the identification of the three species that after four years of strenuous collection of mosquitoes in all parts of the world are all that can be found to fit into them.

Eretmapodites, for example, was instituted for the reception of a species (*quinquevittatus*, Theob.) which presents the peculiarity of having the last two hind tarsal-joints tufted on the male, and this still stands as the principal generic character. Unfortunately, an obviously closely-allied form was met with, for which the MS. name *Er. Austenii* was proposed, but unfortunately for the genus, the feet were untufted in both sexes, so that we were left with a curious case of a genus of two species, one of which lacked the principal distinguishing character.

After a careful examination of the fairly large series of these two forms, I have come to the conclusion that they are undoubtedly identical. Now these specimens were bred from the larvæ by Mr. E. E. Austen, and he noticed at once that some of the males possessed a terminal tuft to the hind legs, while others were from the first without it. This may be accepted as a fact, as Mr. Austen is no ordinary observer, and it therefore follows that the proposed generic character is not even specific, but merely varietal. Again, in *Armigeres* the generic distinction is based on the extension of the third longitudinal inwards beyond the cross-veins as an unscaled vein; but unfortunately many other mosquitoes present this peculiarity, and some of these are Stegomyiæ.

It must, then, be understood that while still employing these generic terms, this is done simply to avoid confusion in nomenclature.

To return to our Philippine mosquitoes.

Finlaya poialia, Theob.. "Caught in the woods, quarters, and hospitals, and bred out from larvæ found in water held in banana plants. A common species."

Finlaya flavipennis, *sp. n.* Wings spotted; generally yellow, especially along the costa, which is mainly pale, except a broad but subdivided spot opposite the forking of V., and numerous

other minute dark interruptions; fringe broadly white spotted. All the last tarsal-joints white, and there are some apical pale bands on the other joints; first tarsals ferruginous, minutely spotted rather than banded with black. Thorax black-grounded, clothed with straw-coloured curved scales, probably disposed to form a linear adornment. Proboscis black at the base, elsewhere ferruginous, but for a very narrow black band near the tip.

♀. Head with median and lateral patches of yellow curved and forked scales, separated by darker areas in which dark forked scales preponderate. Antennæ prominently pale-banded, Palpi with long pale, but slightly brindled, tips. Pleuræ and coxæ with three pale bars. Femora and tibiæ elaborately banded black and yellow, the pale parts preponderating on the former and the dark on the latter. Venter pale ferruginous, with prominent black apical erect tufts.

♂. In the male the abdominal terga are pale yellow, with L-shaped lateral lines, and the palpi are brindled black and ferruginous, with some indistinct banding near the base.

A rather small species.

Habitat.—The Philippine Islands. "Bred out from water held in banana stumps."

Finlaya melanoptera, sp. n. Wings quite unspotted; its veins clothed with uniformly sooty scales, some of those about the middle being of the *Mansonia* form, while those on the outer parts are longer and lanceolate; apical fringe exceptionally long and dense. Tarsi sooty, with ill-contrasted bands on the upper articulations. Abdomen much compressed; sooty, unbanded, but with a very dense fringe of long lighter hairs on the hinder border of each segment. Venter clothed with dusky brown scales on the hinder part of the segments, with a band of dirty white scales, broader externally, across the bases of all but first and last segments.

Springing from the junction of the dark and light portions are fan-shaped tufts of very long sooty scales, which project vertically from the surface so as to look almost like appendages when viewed in profile. The component scales vary in length, the longest being those in the middle of each tuft.

FIG. 2.—(1) Abdomen of *Finlaya melanoptera* viewed laterally; (2) scales of one of the abdominal tufts more highly magnified; (3) scales of head and scutellum.

♀. Head black, with a small tuft of white scales behind the roots of the antennæ; many clothed with flat scales of battledore-shaped outline, mingled with short falciform scales. No forked scales can at any rate be distinctly made out, but there may be some deep in the fold of the nape. Antennæ black, with bare testaceous basal joints. Proboscis and palpi sooty, the latter short, but distinctly five-pointed.

Pleuræ black, with narrow snowy markings; coxæ mainly white. Hind femora entirely white, except a narrow dark band near its base, and another, rather broader, near the apex; on the ventral side these bands are narrower, and those of the other femora are almost entirely white. The remaining leg-joints are dusky throughout, except for broad but ill-contrasted brownish-yellow bands on the tibio-tarsal and first tarsal articulations.

Length, 4 mm.

Habitat.—The Philippines. "Caught in the woods."

Tæniorhynchus Whitmorei, sp. n. Wings uniformly dark-scaled, unspotted. Tarsi with some joints minutely basally banded yellowish, but not on first joints. Ground-colour of thorax fuligenous, densely clothed with white falciform scales, not arranged to form definite ornament. Abdominal segments fuscous, with rather paler brown patches of truncate triangular outline along the middle line, and a line of pale scales all round the borders of the terga. Proboscis black, with a broad yellowish band beyond the middle.

♀. Head with a sooty ground, densely clothed with falciform scales in front, and with white and fuscous erect forked scales in varying proportions, mostly on the nape, and a few strong white bristles projecting forwards between the antennæ; lateral flat-scaled areas snowy; basal joints of antennæ densely white-scaled; palpi very small, dark, with a few white scales at the tip. Halteres with pale stem and ferruginous knobs. Femora mottled with black and white scales. No knee or tibio-tarsal spots. Venter impure white-scaled.

A rather small species.

Habitat.—Philippine Islands. "Caught in the woods."

Stegomyia fasciata, Fabr. "Caught in the woods, very abundant."

Stegomyia scutellaris, Walker. "A very common mosquito in the woods and quarters. Bred from banana sheaths, fire buckets, &c."

Stegomyia desmotes, sp. n. Wing very densely scaled; internal fringe mainly white, at least in certain lights. Tarsal-joints with broad articular bands, except the last two or three joints of fore and middle legs; last two hind tarsals all white, but for a narrow black band on the middle of the fourth joint. Thorax with white curved scales on a dark ground, too denuded to define ornamentation, if any. Abdomen with narrow snowy basal bands and large lateral basal spots. Proboscis unbanded. Generally resembles the *St. fasciata* group, but differs in all the tibiæ having broad white bands. (δεσμώτης, fettered.)

♀. Head with a broad median patch of flat white scales; basal joints of antennæ conspicuously white-scaled; apices of palpi clothed with bushy white scales. Pleuræ with numerous white patches; scutellum white-scaled. There are several conspicuous white dots on the hind and middle femora, and the bases of the hind ones are extensively, and of the middle pair narrowly, white; venter black with broad white basal bands.

A very minute species.

Habitat.—The Philippine Islands. "Taken in the woods."

Stegomyia sexlineata, Theob. (?). Among the specimens of *St. fasciata* were some of different kind, doubtfully referable to the above species, too damaged for exact identification.

Stegomyia crassipes, Van der Wulp. "Taken in the woods."

Stegomyia punctolateralis, Theob. "Taken in the woods."

Stegomyia leucomeres, sp. n. This species closely resembles *St. albocephala*, but differs from that species in the abdominal terga being jet-black, without lateral spots, while the venter, instead of being black, has brilliant broad white basal bands. The wings, tarsi, proboscis and abdominal terga are absolutely unadorned, and the thorax is rather like that of *St. gubernatoris*, having large external spots, and median linear ornament in front, and some other white markings behind.

♀. The occiput is white with a large central flat-scaled black patch on the nape, notched somewhat in front in the middle. Proboscis, palpi and antennæ sooty; pleuræ mainly white-scaled. Almost the inner half of the hind femora is pure white above and even more extensively so below, and the bases of the other femora and the apices of all of them show white spots. Scutellum with flat black scales. The hinder abdominal segments are much compressed and of rather peculiar form. The details of the adornment of the head and thorax seem to vary a good deal, the head in one specimen being all black, but for a pair of small white spots behind the eyes, and in others the mesonotum appears entirely white-scaled. Rather above the medium size.

Habitat.—The Phillipine Islands. "Taken in the woods."

Stegomyia striocrura, sp. n. Much resembles the above, but the hind femora have a narrow continuous black stripe above, no light apical femoral spots, and the general coloration is deep chocolate in place of the jet-black. The head differs in being nearly black, with a very narrow white border behind the eyes and a minute white patch on the nape. The mesonotum is clothed with deep brown scales in the middle, with a complete border of bushy golden-yellow scales.

A rather large species.

Habitat.—The Philippine Islands. "Caught in the woods."

Stegomyia (*Armigeres*) *ventralis* (Walker). This very variable species is sent under no less than three letters, and is recorded as taken both in quarters and in the woods.

Stegomyia (Armigeres) panalectoros, Giles. Also variable: sent under two letters. It differs from the above in being smaller, and having some pale adornment of the thorax, but in view of the great variability of the species, I should, in any future systematic work, treat them as identical.

Culex impellens, Walker. "Very common in and about quarters."

Culex tigripes, de Grand pré et de Charmoy. "Caught in the quarters."

Culex rubrithorax, Macquart. "Caught in the woods. Series variable."

Culex vagans, Wied. "Bred out from larvæ taken in a clear, deep pool, under an overhanging rock. The larvæ in appearance and position much resembled overgrown Anopheline larvæ."

Culex gelidus, var. *cuneatus*, Theob. "Caught in the quarters.'

Culex quassiunivittatus, Theob. "Caught in the woods. Apparently variable."

Culex luteolateralis, Theob. "Caught in the woods."

Culex hirsuteros, Theob. (?). "Caught in the woods." Specimen much rubbed; identification rather doubtful.

Culex concolor, Desvoidy. "Taken in the woods," and also on Lieut. Whitmore's mosquito-net.

Hodgesia, sp. The specimens referred to undoubtedly belong to Mr. Theobald's new genus described in the issue of January 15th, 1904, of this Journal, but unfortunately have fallen a victim to a small mite which was enclosed in the tube with the specimens, and which has eaten off most of the scales. From what remains of the decorations the specimens may very well be identical with his *Hodgesia sanguinæ*, as the highly characteristic wing-scales are quite intact and are unmistakeable, while some few of the remaining occipital scales also correspond with his figure.

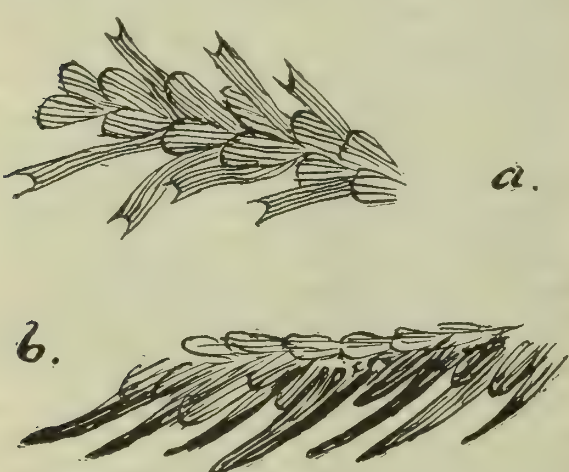


FIG. 3.—*Hodgesia, sp.*, from the Philippines. (*a*) Scales on wing vein; (*b*) portion of the costa to show peculiar thorn-like scales.

A point in the leptolaxis of the wing which he has not noticed is that the costa is armed with peculiar thorn-like scales absolutely identical with those of *Stegomyia brevipalpis*, figured on Plate xiv., fig. 18, in my handbook; and as far as the remaining decoration goes, the present specimens would correspond equally well to that species as to *H. sanguinæ*. But the scales of the wing field in *C. brevipalpis* do not correspond in form with those of *Hodgesia*, so that there can be no question as to their distinctness, though there are many points of resemblance of scale structure between the two species, as Mr. Theobald is wrong in stating that *C. brevipalpis* is "typical Culex," as in the female at least, although the forked scales spread much further forward than is usual in *Stegomyia*, the middle of the occiput is clothed with flat white scales, the ends of which are rounded, much as in *Hodgesia*, and it is needless to say that no such flat scales are to be found in that region in typical Culex. With the view to facilitate the recognition of this peculiar little mosquito I append a drawing of its venation.

SUBFAMILY ÆDOMINÆ.

Uranotænia nitidoventer, *sp. n.* Closely resembles *U. cæruleocephala*, Theob., but has the venter marked by white apical bands, which in certain lights are brilliantly luminous, though rather dull seen in certain other directions. There are glistening white spots on the outer sides of the femora near the apex, especially marked on the hind-legs. The large prothoracic lobes are brilliant blue, and there is a frontal protuberance, like that of *Runchomyia*, but the metathorax appears nude.

The female palpi are very small, and the extremely long proboscis is paler at the tip. The wing has the fork-cells rather longer than is usual in the genus.

A rather small species.

Habitat.—The Philippine Islands. "Caught in the woods."

Runchomyia philippinensis, *sp. n.* Wing unspotted. Tarsi uniformly deep brown. Thorax dark brown, much denuded, but evidently with patches of large flat scales as in *Uranotænia*. Abdomen dark brown, with a row of pale scales, very distinct laterally on the hinder border of the segments. Venter with very brilliant pale triangular patches. Frontal protuberance very large.

FIG. 4.—*Hodgesia, sp.*, from Philippines. Venation of wing (♀).

♀. Head dark, with three patches of flat pale violet scales on the occiput, and a large patch of dark erect forked scales behind. Frontal protuberance nude, pale ochraceous, melon-shaped, with a distinct basal constriction or neck. Palpi short, three (?) jointed, clothed with brown scales and pale hairs. Proboscis very long. Antennæ with nude, ochraceous basal joints. Mesonotum mostly denuded. The prothoracic lobes are developed into, or provided with, peculiar processes shaped like halteres and clothed with pale lilac scales. At the end of the club is a nude brown process shaped like a filbert nut. Veins of wings clothed with flat, broad, and long narrow scales; fork-cells rather short. There are numerous large pale-scaled patches on the pleura and coxæ. Legs rather pale chocolate-brown throughout.

The species is rather above the medium size.

Habitat.—The Philippine Islands. "Caught in the woods."

Fig. 5.—Head and anterior portion of thorax of *Runchomyia philippinensis*.

It is obvious that, if my interpretation of the peculiarities of the prothoracic region be correct, the characters of this species are such as would undoubtedly justify the foundation of a new genus. It is, of course, difficult to get an absolutely certain point of view; and having only a single specimen, I could not employ dissection to clear up matters. I had, however, the advantage of examining the specimen under a special stereoscopic microscope, and I am personally convinced that the peculiar structures described are no mere lobes, in the ordinary sense of the term, but actual appendages, beneath the bases of

which a bristle might be passed, if the feat were not too difficult. A rough drawing of these structures is furnished below, but I was unable to place them in sufficiently good profile to convince Mr. Austen, of the British Museum, of this, when handing over the specimen to him; and accordingly await the receipt of further material before naming the species *Tripteroides philippinensis, sp. et gen. nov.* Assuming the anatomy of the parts to be as I interpret them, these processes are probably the persistent remains of the pupal respiratory syphons, and would therefore represent prothoracic dorsal appendages or wings, in much the same sense as the halteres stand for metathoracic alar appendages. The point can, however, hardly be determined with certainty except by the dissection of specimens preserved in spirit. I hope that Lieut. Whitmore may be able to supply these, or, better still, work out the point on fresh specimens.

Specimens received from Dr. Yale Massey, Benguela, Angola, Portuguese West Africa:—

Mygorhynchus umbrosus, Theob. Specimen much rubbed identification rather uncertain.

Mygorhynchus or *Cellia, sp.* Abdomen and legs wanting. Wing with three small pale interruptions of the dark costa, and two basal dots.

Cellia Pharœnsis, Theob.

Mansonia Africana, Theob.

Culex tæniorhynchoides, sp. n. Wing dark, unspotted. Tarsi barely perceptibly basally yellow-banded on some of the distal joints, but not on the first tarsals. Thorax sooty grounded, with bronzy-golden curved scales in front, and dense tufts of black scales and bristles behind over the roots of the wings. Abdomen sooty, with barely visible ochreous basal bands. Proboscis black, with a sharply-defined ochreous band on the middle.

♀. Palpi black. Head clothed with black forked scales and dark ochreous narrow curved, with a golden spot on the lateral flat-scaled areas. Pleuræ mainly dark. Femora and tibiæ with rows of yellow specks. Abdomen quite without pale lateral spots. Venter dark, with broad ochreous basal bands.

A rather large species.

Habitat.—Benguela, Angola.

A midge, near Tanypus.

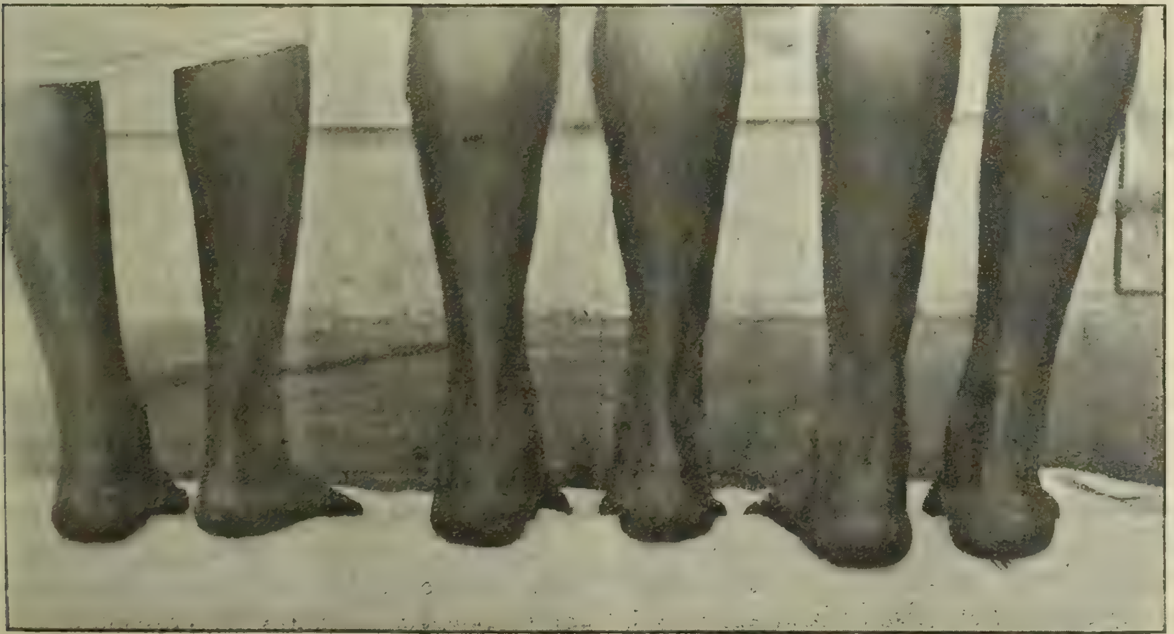
A biting fly, which Mr. Austen tells me is a *Tabanus*, near *T. socius*, Walker.

Of two ticks sent, I am informed by Mr. Pocock, of the Zoological Society, that the larger is *Ornithodorus moubata*, which is concerned in the transmission of "tick fever." For accurate examination, ticks should be preserved in spirit, and owing to the specimens being pinned, Mr. Pocock cannot identify the smaller species.

(*To be continued.*)

Beri-beri—Etiology.

Pinard and Boyé. *Le Caducée*, November 5, 1904. —Surgeon-Majors Pinard and Boyé, from observations made at Konakri, in Guinea, North-west African coast, have come to the conclusion that a meagre diet, not necessarily including rice, plays an important part in causing beri-beri. Their first observations were in 1900, when the native soldiers at Konakri, although supplied with good rations, contracted beri-beri. It was found, however, that the soldiers sold their food to neighbours in order to have money wherewith to gamble, with the result that beri-beri appeared amongst them. Severe measures were taken to prevent this, and in consequence the disease disappeared. In 1902 beri-beri appeared amongst navvies on the railway; the rations were improved and fresh meat given out three or four times weekly; although rice was still continued as a part of the diet the disease quickly disappeared.



Photograph illustrating Dr. C. M. MacLean's article, "On an Endemic Form of Enlargement of the Os Calcis," published in the Journal of Tropical Medicine, November 1st, 1904.

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THE

Journal of Tropical Medicine

December 1, 1904.

THE COLONIAL MEDICAL REPORTS FOR 1901 AND 1902.

The selections from the Colonial Medical Reports for 1901 and 1902 are important contributions to medical literature. The tables are of value, not only from a statistical point of view, but serve also to indicate the geographical distribution of disease.

The reports from but a very few of the colonies deal with the diseases of the colony as a whole; they are, for the most part, composed of statistics derived from the Government hospitals. In the large colonies especially, where white people are in fair numbers, it is evident that, owing to the fact that they are attended, in many instances, at their own homes and by private practitioners, the enumeration of the actual diseases in the locality, when these are neglected, must prove faulty. But this is the case in every country and will remain so until every ailment, however simple, is made legally notifiable. Measles is not amongst the diseases required to to be notified in Britain, yet by official returns we get a fair idea of the prevalence of the disease. So it is in colonial medical returns; we must rely upon official returns for our information, and whilst quite aware that these do not represent the actual number of cases of illness in the colony, we are thankful for the information, and maintain that, as an actual record of disease, the reports compare favourably in scientific value with those from any country of Western Europe.

The inevitable overlapping of cases under different headings it is well-nigh impossible to provide for; yet something more might be done by the contributors to assist the authorities in obtaining exact statistics. It is apt to lead to confusion when normal parturition cases are included under Diseases of the Female Genital Organs, and go to swell the total of these diseases. A few irrelevant instances of the kind might be quoted as occurring in these reports, as in any statistical record of disease; but it is easy to criticise, and we unhesitatingly congratulate the contributors upon their excellent records, whilst we thank them for the valuable information afforded us.

We append a few notes upon some of the diseases dealt with in the reports.

Scarlet Fever.

In only one report, namely, that of Wei-hai-Wei, is scarlet fever notified, and there but a single case is mentioned. Wei-hai-Wei is 37½° N. of the Equator, whilst all the other reports are of localities in the tropical or sub-tropical zone. Scarlet fever is quite evidently a disease of colder climates.

Rheumatism.

The different headings under which rheumatic ailments are returned are rheumatism, rheumatic fever, subacute and chronic rheumatism, and rheumatoid arthritis. Rheumatism would seem to attack an enormous number of residents in warm climates and to be quite a widely-spread and prevalent complaint. We presume by rheumatism the muscular variety is meant, but when it is remembered that muscular pains are common

in dengue, influenza and malarial attacks, it may be that the aches and pains of these and similar illnesses may go to swell the numbers of the "rheumatism" cases. Rheumatic fever is rare, extremely rare, and rheumatoid arthritis is reported from one or two places only.

Plague.

Plague is evidently an uncommon disease in localities within the Tropics, and in no colony, except in those of Hong Kong and Mauritius, has the disease become endemic, and in only one or two places, with the exception of the two colonies mentioned, have sporadic (probably imported) cases been notified. It will, however, be observed that Hong Kong is near the extreme northern limit of the Tropics (22° N.), and Mauritius is near the extreme southern limit (20° S.), so that a continued and equably warm temperature such as prevails within the tropical belt seems inimical to the prevalence of plague.

Malaria.

Fiji, in the Polynesian group of Pacific Islands, and Turk's Island in the West Indies, are the only two colonies from which no cases of malaria are reported, although from Basutoland but one case of undiagnosed type is returned. In all other localities malaria is pronouncedly a scourge. Barbadoes is not included in the analysis of the report for 1901-1902, but it is well known that malaria is not a disease of Barbadoes, and the cause of its immunity was shown by Dr. G. C. Low to be due to the fact that the *Anopheles* mosquitoes did not exist in the island. The same is also true of Turk's Island. Why this particular breed of mosquitoes does not affect certain districts is not definitely known, but the absence of malaria from a few localities is a fact of supreme interest, and one which, when fully investigated, will no doubt contribute to the better understanding of one aspect, at least, of malarial prophylaxis.

Measles, Whooping-cough and Mumps.

Although measles is widely spread in the Tropics the type seems to be mild, for not a single death is recorded from the disease. The same may be said of whooping-cough, and it is a question whether the virus of these diseases is diminished in its toxicity in warm climates, or whether it is to the sequelæ of these ailments in colder climates that their issue is not infrequently fatal. The form of measles in the Tropics, we gather from the reports to be of the typical character, as German measles is also mentioned, but in only one report; in some way the belief has obtained hitherto that German measles was the type which obtained in warm climates.

Tubercle.

The heading "tubercle" amongst the list of General Diseases has in these reports been evidently variously understood by the contributors. Were one to follow the exact returns one would find that the small number of cases enumerated under the term tubercle would seem to justify the belief that tuberculosis was almost an unknown disease in several localities; when, however, reference is made to the heading "Phthisis," under Respiratory Organs, it is seen that phthisis is a prevalent ailment, and tubercle is, in all probability, the cause of the cases of phthisis. This instance seems to illustrate how difficult it is to tabulate disease, even when the most elaborate scheme is devised, and how carefully one has to consider and weigh evidence, which is seemingly exact, as to the prevalence, paucity, or absence of any given ailment in a particular locality.

Colonial Medical Reports for 1901-02.

Malarial Fever Returns.

The variety of classification in these returns prohibited a tabulated form of exact scientific value being compiled. The returns are given below:—

Bahamas.—Intermittent (irregular), 8 cases.

Basutoland.—Type not diagnosed, 1 case.

British Guiana.—Intermittent, 359 cases, remittent, 1,535; pernicious, 43.

British Honduras.—Intermittent, 65 cases, remittent, 7 cases.

Cyprus. — Intermittent: (*a*) quotidian, 38 cases, (*b*) tertian, 29 cases, (*c*) quartan, 25 cases, (*d*) irregular, 17 cases, (*e*) type undiagnosed, 27, remittent, 87, pernicious, 4.

Concerning the use of the term febricula, Dr. George A. Williamson, of Cyprus, remarks: "My experience during the past seven years has been that the fevers met with, apart from the exanthematous fevers, are in order of frequency, malarial fever, febricula or

	Bahamas. Population 55,190		Basutoland. Population 274,240 (European 1,400)		British Guiana. Population 300,748		British Honduras.		Cyprus. Population 237,022		Gambia. Population 13,471		Grenada. Population 65,627		Hong Kong. Population 311,824		
GENERAL DISEASES.	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	
Alcoholism	1	1	..	..	33	2	13	1	..	..	..	..	..	..	45	..	1
Anæmia	6	..	32	..	138	2	40	3	24	..	1	1	31	1	14	4	2
Beri-beri	..	..	..	..	4	..	3	..	..	..	4	1	..	..	532	222	3
Chicken-pox	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	4
Cholera	..	..	..	..	..	..	..	..	..	..	..	..	..	..	207	187	5
Choleraic Diarrhœa	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	..	6
Diphtheria	..	..	3	..	1	..	1	..	..	..	..	..	..	..	7	1	7
Debility	3	..	119	1	180	10	..	..	35	2	6	1	8	..	95	18	8
Delirium Tremens	..	..	..	..	..	..	..	..	..	..	1	1	..	..	13	1	9
Dengue	..	..	..	..	..	..	..	..	..	..	..	..	..	..	573	..	10
Diabetes	..	..	..	..	9	1	..	..	..	..	..	..	3	..	..	..	11
Dysentery	..	..	42	..	448	102	14	..	44	3	8	1	30	9	209	78	12
Enteric Fever	..	..	137	3	8	2	1	..	46	10	..	..	..	..	34	8	13
Erysipelas	..	..	6	..	13	2	1	..	13	..	..	..	..	..	19	1	14
Febricula	1	..	179	..	30	0	4	..	..	..	2	1	..	..	85	..	15
Filaria	..	..	..	..	206	2	..	..	..	..	..	..	..	..	..	..	16
Gonorrhœa	10	..	411	..	229	..	21	..	34	..	13	..	9	..	58	..	17
Influenza	..	..	132	..	11	1	1	..	70	1	..	..	1	..	68	..	18
Leprosy	10	3	28	..	84	..	..	..	122	9	1	..	..	..	..	..	19
Malarial Fever	8	..	1	..	2099	82	72	5	227	3	138	3	96	4	805	124	20
Malarial Cachexia	..	..	..	..	21	3	8	1	..	..	..	..	..	..	17	4	21
Measles	1	..	13	..	..	..	..	..	..	..	..	..	..	..	10	..	22
Mumps	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	23
New Growths—																	
Non-malignant	5	..	122	..	63	..	6	1	3	..	..	..	9	..	13	..	24
Malignant	5	2	8	1	87	20	4	1	19	2	..	..	5	..	19	8	25
Plague	..	..	..	..	..	..	..	..	..	..	..	..	..	..	126	50	26
Pyæmia	..	..	2	..	2	2	..	..	..	..	..	..	..	..	4	2	27
Rheumatism	16	..	477	..	351	..	27	..	35	1	20	..	45	..	126	..	28
Rheumatic Fever	..	..	6	..	..	..	..	..	2	..	..	..	..	..	19	..	29
Rheumatoid Arthritis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..	30
Scurvy	..	..	22	..	..	..	3	1	..	..	..	..	..	..	2	..	31
Scarlet Fever	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32
Septicæmia	..	..	6	..	82	63	1	..	3	..	..	..	..	..	13	10	33
Sloughing Phagedæna	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	34
Small-pox	..	..	1	..	..	..	..	..	..	..	1	..	..	..	4	..	35
Syphilis—																	
(*a*) Primary	8	..	10	..	45	2	..	..	12	..	2	..	12	..	19	..	36
(*b*) Secondary	8	..	322	..	331	21	11	1	22	2	..	..	7	..	112	11	37
(*c*) Tertiary	17	..	4025	..	..	..	1	..	..	..	..	..	21	1	..	..	38
(*d*) Congenital	..	..	410	..	35	10	..	..	4	..	..	..	..	..	..	..	39
Tetanus	..	..	..	..	21	8	..	..	1	..	..	..	3	3	4	2	40
Tubercle	..	..	..	..	227	92	1	..	16	4	..	..	35	12	18	13	41
Whooping Cough	..	..	..	..	7	..	..	..	..	..	..	..	..	..	..	..	42
Yaws	..	..	..	..	52	..	..	..	..	..	..	..	208	2	..	..	43
LOCAL DISEASES.																	
Diseases of the—																	
Cellular Tissue	27	1	349	..	567	13	57	2	62	3	30	..	39	..	176	4	44
Circulatory System	22	3	76	3	240	65	11	6	11	..	1	..	55	5	140	69	45
Digestive System	40	5	5270	3	1335	165	69	7	152	12	97	2	90	10	522	77	46
Ear	3	..	242	..	20	..	3	..	8	..	3	..	..	..	16	1	47
Eye	5	..	500	..	260	..	13	..	165	..	9	..	29	..	41	..	48
Generative System—																	
Male Organs	20	..	62	..	465	2	14	..	21	..	19	..	40	..	54	1	49
Female Organs	8	..	374	..	927	27	9	1	21	..	9	..	99	3	12	..	50
Lymphatic System	2	..	62	..	96	..	15	..	19	1	6	..	10	..	65	2	51
Urinary System	12	..	41	..	856	223	21	7	31	2	5	1	33	3	75	18	52
Nervous System	70	13	335	..	465	43	34	7	84	13	13	1	22	3	193	27	53
Organs of Locomotion	9	1	6	..	211	1	5	..	28	..	11	..	28	2	44	..	54
Respiratory System	28	7	2065	2	1428	460	39	8	113	16	31	4	27	1	678	326	55
Skin	1	..	1015	..	723	..	..	..	77	..	49	..	256	5	182	1	56
Nose	..	..	212	..	12	..	..	..	..	..	..	..	6	..	..	..	57
Injuries, General, Local	30	1	393	..	541	10	35	..	287	13	31	..	60	1	535	35	58
Parasites	..	..	222	..	506	41	19	1	10	1	1	..	..	..	16	..	59
Poisons	3	2	2	1	21	..	..	..	6	1	..	..	..	..	14	6	60

5 cases of Blackwater Fever in Grenada.
1 case of Anthrax and 1 death at Cyprus.
Gout, 12 cases in Basutoland and 7 cases in Hong Kong.
Hydrophobia, 1 case only in Cyprus.

Compiled from the Colonial Medical Reports for 1902.

Seychelles. Population 19,772		Singapore. Population 235,301		Penang. Population 129,462		Province Wellesley. Population 116,267		Malacca. Population 97,369		Negri-Sembilan. Population 110,832		Pahang. Population 84,113		Perak. Population 361,345		Selangor. Population 72,413		Trinidad. Population 273,899		Wei-hai-Wei.	
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	D'ths
..	..	97	..	37	..	1	..	..	..	3	..	2	..	8	..	6	..	18	..	...	..
10	..	376	110	234	38	114	40	100	9	168	29	128	14	600	81	525	66	754	68	5	..
8	2	1465	379	445	139	40	7	259	50	881	81	273	44	3689	556	2673	325	..	..	..	..
..	..	18	..	67	..	5	1	2	..	1	..	2	..	4	1	1	..	287	4	..	..
..	..	979	656	11	10	..	..	..	..	..	..	40	34	..	..	25	23	..	..	16	..
..	..	26	13	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	12	..
..	..	3	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	5	..
10	1	497	147	256	86	52	20	149	19	194	32	282	13	499	54	384	52	298	41	2	..
..	..	..	..	..	..	..	..	1	1	..	..	1	..	1	..	2	..	1	..	..	..
..	..	124	..	19	..	..	..	6	..	..	..	..	..	50	1	65	..	..	..	..	..
..	..	1	..	1	..	..	..	..	..	..	..	2	..	2	..	..	..	17	3	..	..
3	..	626	159	156	68	36	22	73	13	313	115	266	28	2013	631	973	320	205	63	24	..
..	..	219	91	35	15	..	..	2	2	..	..	..	..	24	10	17	8	60	31	..	..
..	..	1	..	3	1	..	..	4	1	1	..	..	..	32	..	9	3	21	7	..	..
..	..	1062	1	19	..	87	..	3	..	1	..	..	..	14	..	185	3	..	..	10	..
1	..	8	..	..	..	..	..	..	..	1	..	..	..	1	..	2	..	..	..	..	..
20	..	414	..	63	..	7	..	38	..	41	..	302	..	227	1	279	..	144	..	23	..
..	..	1	..	..	..	..	..	3	..	..	..	..	..	2	..	17	..	53	..	..	..
..	..	108	23	438	81	15	..	6	..	15	2	7	1	258	44	246	54	21	..	2	..
5	..	1508	192	878	61	44	5	452	10	627	43	1463	33	3920	214	2796	165	1309	63	6	..
..	..	8	2	10	2	..	..	83	2	..	..	..	..	..	..	..	..	102	6	..	..
..	..	3	..	21	..	..	..	2	..	5	..	..	..	3	..	15	..	11	..	..	..
..	..	9	..	4	..	..	..	1	..	..	..	..	..	5	..	4	..	1	..	..	..
3	..	11	1	8	..	2	..	..	..	..	..	1	..	17	..	26	2	79	..	..	..
6	1	10	3	9	6	2	2	5	3	..	..	3	1	28	9	31	23	37	8	..	..
..	..	2	2	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	2	..	..	..	..	..	..
14	..	252	..	142	..	43	..	67	..	115	6	326	2	151	2	1100	3	188	..	27	..
..	..	1	..	2	..	..	..	..	..	..	..	1	..	1	..	3	..	..	..	..	..
..	..	5	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
..	..	9	9	2	..	1	1	..	..	..	..	..	..	4	4	2	2	12	6	..	..
..	..	113	13	45	19	2	..	..	..	13	4	1	1	39	11	37	5	..	..	1	..
..	..	123	28	211	45	30	6	29	5	1	1	1	1	..	..	..	..	..	..	1	..
21	..	391	..	148	..	11	..	47	..	33	..	39	..	308	3	326	..	6	..	22	..
..	..	1299	134	609	34	20	..	271	..	15	1	85	..	1315	56	167	4	41	2	30	..
..	..	..	..	..	..	25	2	10	1	..	..	..	..	..	..	..	..	69	7	5	..
..	..	..	..	..	..	..	..	..	..	1	..	74	1	2	..	145	6	22	6	..	..
..	..	6	5	7	4	..	..	1	..	..	..	1	1	2	2	1	1	39	23	..	..
..	..	668	337	5	..	12	6	25	12	59	2	46	14	22	11	327	173	291	120	3	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	..	2	..	1120	5	..	..
2	..	240	8	98	2	26	1	46	1	89	9	119	..	560	27	303	7	204	4	188	..
5	..	61	38	19	8	9	5	18	1	..	..	21	1	148	19	62	19	171	46	5	..
46	5	1084	264	904	312	193	70	228	36	383	130	1559	42	1884	106	2180	588	1298	294	337	..
..	..	12	..	6	..	3	..	3	..	2	..	82	..	8	..	23	..	8	..	21	..
5	..	170	..	263	..	20	..	22	..	15	..	129	..	243	10	249	7	318	..	128	..
9	..	122	3	83	2	7	..	36	..	21	..	85	..	238	6	93	1	376	7	47	..
3	..	10	..	15	..	1	..	1	..	5	..	43	..	44	2	26	1	803	38	27	..
1	..	65	..	56	..	14	..	56	..	33	2	196	..	338	5	76	2	50	3	12	..
15	2	46	15	30	7	7	2	59	15	8	2	63	..	311	83	108	27	393	139	1	..
7	1	626	88	183	15	31	2	42	4	51	5	120	2	415	90	376	71	470	99	62	..
..	..	57	2	43	3	13	2	49	5	16	1	293	..	149	7	93	5	126	2	31	..
24	2	361	72	416	146	76	20	118	33	244	40	515	27	887	435	848	190	698	143	73	..
1	..	844	3	613	1	159	1	681	..	798	9	1161	8	2766	76	2578	8	11071	9	261	..
..	..	2	..	1	..	..	..	..	..	1	..	6	..	6	..	17	..	39	..	28	..
29	..	873	31	428	14	122	7	128	4	195	4	654	3	1296	47	1066	44	887	36	130	..
..	..	114	1	3	..	24	..	35	..	22	..	711	..	249	4	16	..	34	..	161	..
..	..	25	3	7	1	1	..	9	..	3	..	50	..	55	3	4	1	44	2	15	..

The returns of Marasmus are not sufficiently reliable to tabulate.
Sleeping sickness only 2 cases and 2 deaths in Gambia.
Of Varicella, 15 cases in Cyprus and 2 in Gambia.

simple continued fever and undulant fever. I am aware that many persons object to the name febricula, but I cannot see how otherwise are to be classed the many cases seen each year of fevers which are not malarial, enteric, nor undulant."

Fiji.—No malaria reported.

Gambia.—Intermittent, 130 cases, remittent, 5 cases, pernicious, 3 cases.

Grenada.—Remittent, 96 cases.

Hong Kong.—(*a*) Quartan, 27 cases, (*b*) simple tertian, 211 cases, (*c*) malignant, 439 cases, (*d*) mixed infections, 28 cases.

St. Lucia (1901).—Intermittent, (*a*) quotidian, 390 cases, (*b*) tertian, 202 cases, (*c*) quartan, 49 cases.

Seychelles.—Malarial fever, 2 cases.

Sierra Leone (1901).—Intermittent fever, 147 cases, remittent, 3 cases.

Singapore.—Intermittent, 887 cases, remittent, 619 cases.

Penang.—Intermittent, 787 cases, remittent, 91 cases.

Province Wellesley.—Intermittent, 42 cases, remittent, 2 cases.

Malacca.—Intermittent, 435 cases, remittent, 17 cases.

Negri Sembilan.—Intermittent (at Seremban), (*a*) simple tertian, 147 cases, (*b*) mixed tertian, 91 cases, (*c*) quartan, 17 cases, (*d*) irregular, 3 cases, (*e*) undiagnosed type, 140 cases; out-station, intermittent, 173 cases, remittent, 43 cases, pernicious, 13 cases.

Pahang.—Intermittent (389?) (*a*) quotidian, 416 cases, (*b*) tertian, 263 cases, (*c*) quartan, 11 cases, (*d*) irregular, 11 cases, (*e*) undiagnosed type, 125 cases, remittent, 42.

Perak.—Intermittent (*a*) quotidian, 1,124 cases, (*b*) tertian, 190 cases, (*c*) quartan, 19 cases, (*d*) irregular, 745 cases, (*e*) undiagnosed type, 1,484 cases, remittent, 349 cases, pernicious, 9 cases.

Selangor.—Intermittent, malignant, 248 cases, tertian, 186 cases, quartan, 90 cases, mixed infection, 15 cases, undiagnosed type, 2,214 cases, remittent, 29 cases, pernicious, 14 cases.

Trinidad.—Benign tertian, 1,170 cases, remittent, 162 cases, malignant quotidian, 77 cases.

Turk's Island.—No malaria reported.

Wei-hai-Wei.—Intermittent, 4 cases, remittent, 2 cases.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the Journal of Tropical Medicine *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

"Indian Medical Gazette," November, 1904.

I.—Insanity following the Use of Indian Hemp. G. F. W. Ewens, M.D., Major, I.M.S.

II.—Casualties in Action in Tibet. C. N. C. Wimberley, Major, I.M.S.

III.—The Malarial Cachexia of India. (Editorial.)

I.—Major Ewens states that there is a special form of mental disease met with in India, usually classed as toxic insanity, which seems to have a direct relation to the excessive use of hemp drugs in any form. Hemp is used in three chief forms: (1) Bhang is a mixture of the leaves and capsules from which a decoction is made; (2) Ganja consists of the stem, leaves and flowers malted together and smoked in a pipe usually along with tobacco; (3) Charas is the resinous exudation from the leaves and flowers, and is either smoked or swallowed whole. Other preparations, generally decoctions, are locally termed: Thandai, Siddhi Sabzi and Patti. Haschisch is the Arabian preparation of hemp, and is analogous to the Charas used in India. The drug is taken for the "pleasurable" sensations it induces, and is drunk by Sikhs especially, as "punch" was drunk in Scotland and Ireland after dinner. The hemp habit is not widespread; but its pernicious effects are understandable when nearly 33 per cent. of the male patients in the Punjab Lunatic Asylum are believed to have been habitually hemp-drug takers at one time or another. Whether the hemp-taking was the cause of the insanity, or whether the intoxicant was taken by men (for women are not addicted) of weak mental balance, it is of course impossible to say. Of 95 cases recorded by Major Ewens, 6 have become demented, 6 died, 46 recovered, and the remainder are still under observation.

II.—Major Wimberley gives details of 83 cases treated by him for wounds sustained during the Tibet expedition. Of the number, 15 were killed in action, 68 were wounded, of whom 7 died subsequently of their wounds. Of the 15 killed in action 13 were due to gunshot wounds of the head, chest, or abdomen. Concerning the wounded, the most remarkable feature is the rapidity with which wounds that had been dressed with dirty rags in native huts, and whilst the patient lay in filthy surroundings, healed by first intention.

III.—Since the Leishman-Donovan bodies were discovered it is difficult to give a satisfactory name to this condition; "cachexial fever" and "tropical splenomegaly" are among the names recently introduced, but it will become necessary soon to revise the nomenclature, more especially if Roger's statement that these bodies are stages in the development of a trypanosome are found to be true. Lieut. Christophers, I.M.S., in the *Scientific Memoirs*, No. 11, classifies the infection of the parasite as two, *viz.*, a local lesion—tropical ulcer, and a septicæmia—the so-called malarial cachexia of India. He further states that noma and perforation of the large intestine would indeed appear to be the chief causes of death in infection by the parasite. In this suggestion we would appear to possess a key to dysentery of a low gangrenous form, and to the "terminal dysentery" which not uncommonly supervenes shortly before death in cases worn out by disease in India, and especially in cases which used to be called malarial cachexia. Considering the trypanosomes are by many believed to be the cause of the above-mentioned ailments as well as of sleeping sickness and relapsing fever, the trypanosomal parasite bids fair to occupy the place in tropical pathology once claimed by the malaria parasite.

"Journal of the Malay Branch of the British Medical Association."

Session 1903-1904. Singapore: Kelly and Walsh, 1904. New Series, No. 1. Price 1 dollar.

CONTENTS.

Abstracts from Articles appearing in the Journal.

Some Clinical Features of Quartan Malaria. By M. Watson, M.D.(Glas.), D.P.H.(Camb.), District Surgeon, Klang, Selangor.

The most striking feature of the series of cases of quartan malaria on which my observations have been made has been the absence, in the majority, of the characteristic quartan pyrexia. The extraordinary periodicity of the pyrexia, which gave a name to the fever in ages long gone by, and which enabled the physicians of those days to differentiate it from the host of other fevers, was absent in no less than 60·6 per cent. of my cases. But for the examination of the blood, the essential element in many of the cases would have been overlooked and the treatment futile.

The special features of the illness are dealt with by Dr. Watson.

(1) *Fever.*—Although the fever was not characteristic in many of the cases, it was by no means absent in the majority; in some there were daily rises of temperature; in others an occasional rise at long intervals. Of a total of 83 cases, 1 absconded on the day of admission, 16 received quinine within three days of admission, and 66 did not receive quinine for at least three days after admission.

	No of Cases.	Percentage.
Recognisable (single or double)	26	39·40
Unrecognisable pyrexia, mainly quotidian	16	24·24
" " at long intervals	12	18·18
" absent	12	18·18
	66	100·00

The preceding table shows an analysis of the temperature charts of 66 cases of quartan malaria.

It is thus seen that in 36·36 per cent. of the cases pyrexia was noticeably absent, and in 18·18 per cent. the temperature was normal. Of the 12 cases with normal temperatures, 4 had triple infections.

Under the microscope the infection was recognised as triple in 30, double in 8, and single in 44 cases; while in one with the characteristic temperature chart of a single infection, prolonged examination of the blood from the finger and the spleen revealed numerous unpigmented amœboid parasites and crescents, but not a single pigmented parasite distinguishable as quartan.

Before passing from the subject of temperature the great tendency towards the disappearance of pyrexia by simple rest in bed should be noted. In 14 cases the temperature became, and thereafter remained, normal in an average of 3·4 days.

(2) *Œdema.* — After fever the patient usually complains of swelling. This varies in amount; in some there is only slight œdema of the feet; in others it is a more prominent feature, but is still moderate in amount, involving at times the legs and hands, at other times the eyelids; while in the third group the legs, arms, abdomen, chest and face are greatly swollen, the pleural cavities half filled with fluid, the lungs waterlogged and full of moist *rales*, and the patient will sit up, gasping for breath. In these cases of severe hydræmia the condition directly threatens the patient's life.

In the series of 83 cases œdema was prominent, *i.e.*, was moderate or great in amount, in 27 (32 per cent.), and in 15 (18·0 per cent.) was so great as to overshadow all other features of the case. Of these 15 cases, the microscope showed a triple infection in 12, double in 2, and single in 1. The temperature charts were characteristically quartan in 4, while in the other 11, 5 showed irregular pyrexia, 3 no pyrexia for twenty-seven and twelve days respectively, 2 had pyrexia at long intervals (eight and nine days), and 2 received quinine immediately on admission. The urine was normal in 5, contained a small amount of albumen in 1, contained a considerable amount in 5 (in 2 solid on boiling), and in 4 there is no record.

(3) *Diarrhœa or Dysentery.*—The next group is that in which diarrhœa or dysentery was the most prominent feature. For obvious reasons this symptom impressed itself strongly on the sufferers, and made it the main, and in two the sole, ailment of which they complained. In 17, or 20·4 per cent., of the 83 cases there was diarrhœa or dysentery on admission.

It is interesting to observe that although quartan malaria forms only a small minority of the malarial cases admitted to hospital, it supplies practically all the cases of malarial cachexia. Malignant malaria rarely presents itself in a chronic form, being very fatal to the Tamils and Chinese, from whom the cases are drawn.

(4) *Infection by Pyogenic Organisms.* — Septic organisms also have an opportunity of asserting themselves, and in 5 cases the patients suffered from abscess. In three the abscess was single and in two multiple.

Pulmonary Complications.—In nearly all cases of

malaria there is a cough, in a considerable number severe bronchitis, and pneumonia frequently follows on the cachectic condition.

(6) *Association with other Diseases.*—Ulcers are frequently found in cases of quartan malaria, and the ulcer may be the sole complaint recognised, until some slight rise of temperature leads to an examination of the blood.

In two cases the patients were attacked by beri-beri after the onset of the fever.

Prognosis and Mortality. — When neglected, the disease, as has been seen, frequently leads to serious results. Of the 83 cases, 8 died in hospital, 5 from diarrhœa or dysentery, 1 from beri-beri, 1 from cirrhosis of the liver, and one from thrombosis.

This gives a death-rate of 9·6 per cent. If to these be added the four with diarrhœa who absconded unimproved, and *who would almost certainly die*, there is a death-rate of 14·4 per cent.

Apart from cases which were almost hopeless from the first, the prognosis is extremely good, even in severe cases of the cachexia.

The Effect of Quinine.—Quartan malaria is, in a most striking way, amenable to quinine. It is rare for more than one attack of pyrexia to occur after the exhibition of the drug in ten-grain doses night and morning. In my series more than one attack took place in only three cases.

NOTES ON THE LOCAL CONSUMPTION OF ALCOHOL. By W. R. C. Middleton, M.B., D.P.H.

After dealing with the question of the consumption of alcohol in Singapore, Dr. Middleton states :—

"It is probable that the effects of alcohol on the constitution of the European in the Tropics have been exaggerated, and the results based only on cases due to over-indulgence. Judging by the numbers of adult Europeans of one's own acquaintance who have a daily quantum of stengahs, slings, pahits, &c., and who lead an active life, the results can, I think, be hardly as direful as they are usually painted, and as far as my experience goes out here the results of over-heating (which is usually seen in teetotallers) is likely to lead to as much indisposition as a moderate use of alcohol."

TUBERCULOSIS AMONG THE CHINESE IN SINGAPORE. By Lim Boon Keng, M.B., C.M.(Edin.).

Tuberculosis is a common disease in Singapore. As the Chinese form the bulk of the population in the town, I have had abundant opportunities, during ten years' practice among them, of making observations on all stages of phthisis, and as affecting nearly all classes of the Chinese community. All forms of superficial tuberculosis are practically unknown. Lupus, for example, is exceedingly rare. I have only met with one case in a Hainan youth, whose photograph, with a few notes, appeared in the JOURNAL OF TROPICAL MEDICINE a couple of years ago. While all other varieties of eye diseases are common, I have never met with tubercular disease of the eye in any shape.

Struma, or scrofula, with caries of bone or synovial degeneration, is practically absent. Once in a way we come upon Pott's disease or a psoas abscess, but extremely rarely. The Chinese do not use milk to any extent. May we attribute the rarity of bone and joint tuberculosis to the absence of bovine tuberculosis? Or must we give to our sun and climate the credit of inhibiting tuberculosis in bone and superficial tissues?

In fact, practically the chief form of tuberculosis I have had to deal with is pulmonary phthisis, and its complications in the last stages, when the disease may become generalised. The comparative rarity of tubercular meningitis and miliary tubercle is deserving of note, especially as among the Chinese here, as elsewhere, phthisis runs in families and frequently decimates them.

The Chinese consider phthisis to be an infectious disease caused by "living germs," which leave the patient in swarms as soon as death supervenes, in order to seek pastures new in the shape of other human beings. The people, therefore, dread very much approaching persons dying from phthisis. They have a superstition that these germs have a predilection for omelette, and that they will fly away if direct sunlight is thrown into the house by making an opening on the roof. Consequently, it is the custom to place a broad piece of omelette on the face of the dead and to make an opening in the roof as soon as a phthisical patient dies. I have mentioned this fact in detail as it seems to me this is useful to know, as prophylactic measures will undoubtedly be listened to, if the people understand them.

OBSERVATIONS ON DENGUE FEVER IN SINGAPORE. By F. W. More, M.B., Ch.B.(Edin.).

After an absence of thirty years dengue fever made its reappearance in Singapore in the autumn of 1901.

Sporadic cases, at first unrecognised, occurred during a short period prior to the onset of the epidemic proper. This latter lasted from about the beginning of September, 1903, to near the end of the year, and was followed by an endemic period, from which we are but now emerging. It was unquestionably a most severe epidemic, and it excited an amount of interest among all classes, only to be compared to that which attended the great influenza outbreak at home in 1889-90. To give only one instance of its general prevalence: Of twenty-one Europeans employed in one department of the Tanjong Pagar Dock Co., Ltd., fourteen were absent on one and the same day suffering from dengue.

Its established reputation for rapidity of advance along the main trade routes was well sustained in this most recent visitation. Originating in all probability in Java, which is popularly regarded as an endemic focus, epidemics occurred almost simultaneously here and in Hong Kong, Bangkok, Penang and Province Wellesley, parts of the Federated Malay States, and later in other China coast towns and in Japan. In Hong Kong the advent of the cold season checked the 1901 epidemic, but the disease broke out again in the summer of 1902, and during that year more cases of dengue were admitted to the hospitals than of any other disease. Among over 470 admissions during the two years there were no deaths.

The endemic period here has been characterised by a series of short "bursts" of dengue, of gradually

decreasing severity, occurring every few months, with sporadic cases in the intervals. New-comers are still almost invariably victimised, and it has been frequently observed that among those who had already had the disease, a return to the Colony, after a temporary absence, has been followed by a fresh attack.

No age is exempt. Sex is without marked influence. There is apparently no race immunity, but Europeans would appear to be specially susceptible. The disease is independent of occupation, social position, habit of body, long or short residence, habits as to food and drink, and of malaria. One attack gives protection in a majority of cases, but for how long it is impossible to say. Recurrences have been noted in 4 per cent. of cases within two years, but this estimate is probably too low, as, owing to the now well-known clemency of the disease, there is a growing tendency to dispense with medical help in treatment. An interval of eight to twelve months between attacks is a common one.

The incubation period was three to four days in 80 per cent. of the cases in which the source of infection seemed clear; of the remainder, 15 per cent. had a shorter and 5 per cent. a longer period. These last, however, must remain doubtful in view of the possibility of the infection being conveyed in clothing, by means of squames, &c.

As the epidemic period passed into the endemic a gradual change of type was observable. A milder onset, decrease in the severity of the pains, a more variable course of temperature, and a less constant secondary rash, were the main indications.

Among concurrent infections, likely to cause confusion in diagnosis, a mild measles epidemic occurred in the summer of 1902; there was also about this time a considerable number of small-pox cases, which, in their early manifestations, bore a close resemblance to dengue.

Among the lower animals, dogs at least would appear to be susceptible.

That dengue is a coast disease seems to be largely a matter of circumstance. The aggregation of people on the sea coasts, and the greater facilities for intercommunication thus afforded, naturally leads to a higher incidence there.

Treatment.—Prophylaxis is out of the question. During the acute stage rest in bed should be enjoined, with light nourishing diet and avoidance of alcoholic stimulants. It is not well to encourage purgation. Otherwise the treatment is entirely symptomatic and directed mainly towards the relief of the pains and headache, the reduction of the fever, the procuring of sleep, and the promoting of perspiration. Quinine and phenacetin in combination were found very useful. Sodium salicylate and salicin were also of benefit in the severe pains. Opium and morphia were seldom required. Sulphonal and trional were only occasionally resorted to. During convalescence tonics like Easton's Syrup, a liberal dietary with wines or stout, avoidance of over-exertion, precautions against the effects of sudden change of temperature, and in the worst cases change of air and scene or a sea voyage. For the persistent joint pains, liniments, massage, &c., may be recommended with benefit, and potassium iodide, quinine, arsenic, iron, &c., given internally.

The Fevers of West Africa: Their Nature, Treatment, and Prevention. By J. Ritchie, M.B., F.R C.S.E. (Major, R.A.M.C.).

A paper read before the Association on July 4th, 1903.

Malarial Fever.—Among all the fevers which attack Europeans in West Africa, malarial diseases, of course, take the foremost place. One remarkable feature is the rarity of intermittent fever on the coast, unless the patient has previously served in a malarious country and there suffered from intermittent fever. Thus in officers of the West India Regiment whom I treated for fever, 5 per cent. showed the intermittent type; all of these had had ague in the West Indies. On the other hand, with the men, none of whom had had fever before, only 1·4 per cent. showed the intermittent features. In the interior, however, while true intermittent fever is rare it is commoner than on the coast, 14 per cent. of the cases being intermittent in type, and even the cases of remittent fever approaching more to the intermittent type than do those seen on the coast. Another feature of West African fevers is that there is seldom that feeling of malaise described in other countries as preceding an attack of fever. My experience has been that the patient is very suddenly attacked and generally has rather an exalted sense of perfect health for a day or two before his seizure. The fever has the usual symptoms, the pyrexial period lasted on an average in my case five or six days. Relapses occurred in 12 per cent. of my cases. Though I have carefully gone through the temperature charts of cases I have treated during 1897 and 1898 I have not yet seen any case to bear out the remarkable experience of Dr. Marchoux, as recorded in his paper, "*Paludisme au Senegal,*" that these relapses always occurred twelve days after the day of the original attack, thus corresponding to the changes in the parasite at that date.

Hæmoglobinuric Fever or Blackwater Fever.—From the time I first observed this disease I was struck with its resemblance to yellow fever, and I consider it probable that some at least of the cases described in West Africa as blackwater fever and other similar names are really cases of yellow fever. The points on which I would lay stress in urging this are as follows:—

(1) In the cases given there is an absence of periodicity as in yellow fever.

(2) The urine in both diseases is diminished in quantity and albuminous.

(3) The spleen was unaffected as in yellow fever.

(4) Jaundice occurred in all cases and only at a late period of the disease and was accompanied by grave symptoms. It also disappeared before death and reappeared after death as in yellow fever.

(5) As in yellow fever, the Negro race enjoyed comparative immunity. Thus when the first two cases occurred, two out of eight Europeans were attacked, while 200 black soldiers stationed in the same building and under the same conditions escaped. The other two were two out of three cases which occurred among the Europeans, the whole black civil population as well as troops escaping.

(6) Quinine, so generally beneficial in malarial fever, is generally considered useless, if not harmful, in blackwater fever. It is the same with yellow fever.

(7) Black vomit I consider pathognomonic of yellow fever. It occurred in two out of the four cases I have quoted.

(8) The *post-mortem* appearances of the two diseases are identical.

These considerations induce in me the belief that all these cases were yellow fever, and that many cases described in West African reports as pernicious, remittent fever, blackwater fever, bilious remittent, &c., are really yellow fever. There certainly is a variety of malarial fever attended by hæmoglobin in the urine. This, however, is of quite a different type to the cases I have quoted. It occurs in those who have suffered much from malaria, and never comes in an epidemic form, as do the cases I consider yellow fever. It is simply to my mind a severe form of malarial fever not requiring a distinct name. The fatal disease to Europeans, and especially to young Europeans, in West Africa, I believe to be yellow fever. If blackwater fever exists as a separate disease in West Africa I have never come across it.

Notes on Malarial Fever. By D. J. Galloway, M.D., F.R.C.P.(Edin.).

A paper read before the Association on November 28th, 1903.

In the course of his remarks, Dr. Galloway states the opinion of an old practitioner in Singapore that malaria, at one time very prevalent in this town, had become less and less so until, with the exceptions to be mentioned later, it was doubtful if any other than imported cases were met with. This was about 1880. During the decade following great strides were made in the opening up of the Malay Peninsula to commerce, with a corresponding increase in the amount of migration between it and Singapore.

The result of this was that, firstly, the imported cases became more common, then indigenous cases were added, and from that time till now these have gradually increased, till at present they probably far exceed the former.

The Question of Immunity in Malaria.—Natural immunity to malaria has been demonstrated in the lower animals, and many observations of a relative natural immunity have been made on man. I purposely avoid quoting instances of immunity in native races under this head, as the difficulty of obtaining a reliable personal history leaves it in doubt as to whether the immunity is natural or acquired. Yet in some Europeans who have been under my own observation I had one who, in spite of constant exposure throughout nineteen years, had never had malaria, and several who had remained immune for intervals ranging from four to seven years. These cases are instructive, as there could be no question of the absence of any personal or hereditary adaptation. They have always been to me a most interesting clinical study, while the panoply of defence in some was sufficiently perfect to withstand repeated changes to Europe or other temperate climes; in others it seemed to break down completely even on changing a district.

Acquired immunity is a subject that should receive the most careful consideration, as, if we can satisfy ourselves that such an immunity exists, it may be our duty as practical physicians to stay our therapeutic hand, and to assist our patient to acquire such measure of protection as is attainable from the "spontaneous" cure of malaria.

Koch found that when those immune tribes which he describes in West Africa were moved down to the coast they suffered more severely than the inhabitants of that district, and we as physicians probably know of instances in which the immunity of years has broken down under somewhat similar circumstances. Celli, and with him most of the Italian school, concludes that an acquired immunity is rare and never complete. Among native women the breaking strain is commonly pregnancy. The malaria then rarely manifests itself in frank attacks, but as a sub-febrile condition, continuing throughout the latter months of pregnancy, and with frequent chills not amounting to rigor, and, when that has terminated, flaring up into a typical abscess. There is also an implication of the peripheral nerves, and this forms one of the types of puerperal neuritis so commonly met with here.

The more one thinks over the doctrine of phagocytosis in relation to malaria the more is one attracted to it by its extreme feasibility and the easy means it affords of explanation of much that is obscure.

An Analysis of One Hundred and Fifty Cases of Local Fever. By James Kirk, M.D.(Edin).

The death-rate of the town of Singapore for the year 1902 was estimated at 51·15 per mille. The population within the municipal limits at the 1901 census was 217,070. The components of this population, with their corresponding death-rate for that year, were as follows:—

The Europeans numbered		3,646,	with a death-rate of		25·75
,, Eurasians	,,	4,166	,,	,,	26·29
,, Chinese	,,	161,089	,,	,,	54·25
,, Malays	,,	27,559	,,	,,	46·89
,, Indians	,,	17,773	,,	,,	42·16
Other Races	,,	2,837	,,	,,	38·15

The total infantile death-rate (for children under one year old) was returned at 339·4 per mille in 1902. Including all nationalities, the following three diseases were estimated as causing the largest number of deaths in 1902:—

Remittent Fever	2,051
Phthisis	1,334
Beri-beri	1,065

The cases reported upon by Dr. Kirk were drawn from all classes of the population—Europeans, Eurasians, and all grades and races of the native community are represented. A brief analysis of the cases is as follows:—

Total number of cases 150, comprising		Malaria	98	cases.
		Typhoid	28	,,
		Miscellaneous	24	,,
Analysis of Malarial fever cases	Local infection .. 48	Malignant	8	,,
		Benign	40	,,
	Imported infection 50	Malignant	20	,,
		Benign	30	,,
Malaria and race incidence	Local infection ..	Europeans	7	,,
		Eurasians	5	,,
		Chinese	28	,,
		Other nationalities	8	,,
	Imported infection ..	Europeans	10	,,
		Eurasians	3	,,
		Chinese	16	,,
		Other nationalities	21	,,

Absent: A. E. Neale, L. de Roux, J. H. Cook.

1st Row:— G. Lane, Miss A. M. Macphail, R. Johnston G. B. Warren (Laboratory Assistant). H. N. H. Joynt, L. A. Holcroft, A. W. May, J. Gillies, A. F. Cole, T. R. Robertson, C. A. Bentley.

2nd Row:— P. Phillips, H. R. Ellis, D. A. Ashton, A. C. Lorena, D. Alexander, T. G. D. Cooper, C. M. MacLean, J. W. Gromitt, R. Dane, J. C. Carr, D. H. Ainslie, H. T. Hodgkin.

3rd Row:—Miss K. A. Dawson, Dr. Douglas (Demonstrator). Dr. Oswald Baker, Mr. P. Michelli (Secretary). Sir Patrick Manson, K.C.M.G. (Lecturer). Dr. Sandwith (Lecturer). Sir Francis Lovell, C.M.G. (Dean). Dr. Sambon (Lecturer). Miss M. K. Gibson, Miss H. M. Mayo, Dr. Low (Medical Superintendent). A. Sultana.

4th Row:— B. M. Flood, W. A. Densham, W. O. Pou (House Surgeon). J. C. Bhuttacharji, C. H. D. Ralph, F. L. Norris, L. S. Chibas.

THE LONDON SCHOOL OF TROPICAL MEDICINE.

16th Session. October-December, 1904.

Bale, Sons & Danielsson, London.

Typhoid and race incidence ...	Europeans	4 cases.
	Eurasians	5 ,,
	Chinese	15 ,,
	Other Nationalities..	4 ,,

Local Malaria and Race Incidence.—Infection is extremely infrequent among the European civil population, and of the seven cases I have notes of only two were in adults, the remaining five being in children. The European of this class is little exposed to infection; he generally lives in airy-sanitary quarters well away from the native population and the infected Anopheles; the mosquito-curtain is also in universal use. His children, are, however, often not so fortunate. They live in close contact with their native ayahs and often sleep in the same room, and if the ayah is infected, as is very probable, it only requires the presence of a hungry mosquito to complete the vicious circle. One has also to bear in mind the lessened resisting powers of the blood of the child.

Clinical Characteristics of Local Malaria.—The great majority of cases, as shown by the table, are of the benign tertian variety. Malignant or sub-tertian cases are in the great minority. Quartan fever is, in my experience, rarely met with, but as the symptoms produced by this variety of the parasite are often so anomalous and insidious it is probably frequently overlooked. The so-called benign tertian is generally met with as a multiple infection. One rarely comes across single infections in general practice. Such a condition is generally ignored by the native. The European will immediately dose himself with quinine and abort the attack. The native probably contents himself with some native remedy, and it is not till the parasite begins to multiply in his blood and the fever becomes continuous that he seeks medical advice.

Typhoid Fever.—All of my cases in young children occurred in natives and Eurasians. European children rarely get typhoid, and their sanitation and surroundings are generally good. One of the great sources of infection to native children are the itinerant refreshment dealers whom the young Mongolians patronise with such avidity. Ice-cream sellers here, as at home, are responsible for a great deal of juvenile sickness and mortality, and a casual acquaintance with the habits of the rising native generation makes it easy to understand that it is neither the fault of themselves or their guardians if they escape enteric infection.

(*To be continued.*)

Notes and News.

We are glad to know that the Royal College of Physicians, England, and the Royal College of Surgeons, London, are at last dealing with the question of a diploma in Tropical Medicine. They are late in the field, Cambridge having already anticipated their action, but after many adverse opinions to the idea, a joint committee of the two Colleges submitted a proposal to the effect that "after a sufficient period of observation of such tropical diseases, candidates should be admitted to an examination held by the Royal Colleges, and on passing it should receive a diploma in testimony of this addition to their professional experience." This report was submitted to further deliberation, and it was subsequently agreed by the two corporations—(1) That with the permission of the authorities of the School of Tropical Medicine, visitors be appointed by the Royal Colleges of Physicians and Surgeons to attend the examinations of that school and to report upon the scope of the course of study and of examination, and that a request be addressed to the naval, military and colonial authorities to allow visitors appointed by the two Royal Colleges to attend their examinations in tropical medicine for a similar purpose. (2) That, at the end of a year, a report be addressed by these visitors to the Royal Colleges on the whole subject of tropical medicine. (3) That, in the event of the Royal Colleges adopting these recommendations a communication be sent to the Colonial Secretary informing him of these proceedings.

Colonial Appointments, &c.

Dr. L. V. Dubois, Government and Poor Law Medical Officer of Pamplemousses, Mauritius, has been appointed Government Medical Officer, Savanne. Dr. L. de Boucherville takes the place of Dr. Dubois at Pamplemousses.

Mr. John Ironside, of the Medical Department of the Orange River Colony, has been promoted to the position of Secretary and Registrar of the Medical and Pharmacy Council of that Colony.

Dr. J. H. Bain has been appointed District Surgeon of Richmond, Cape Colony, in place of Dr. David Traill, who has resigned, and Dr. Ludwig Schloss becomes District Surgeon of Bredasdorp.

The name of Dr. Alice D. Sibree, of the Alice Memorial Hospital, has been added to the Register of Medical and Surgical Practitioners qualified to practise medicine and surgery in this colony.—*Hong Kong*, September, 1904.

Dr. E. H. Tweedy, Senior Medical Officer of the Gold Coast Colony, acts as Cantonment Magistrate of Kumasi in place of Captain T. A. Pamplin Green, who is acting as Commissioner for the North-western District of Ashanti.

Literary References.

TROPICAL DISEASES.

DYSENTERY.

Austin, O. L. The Clinical Features of the Epidemic of Dysentery at Tuckahoe, N.Y., during the Summer of 1902, *Med. Rec.*, New York, 1904, vol. lxvi., p. 206.

Berne, J. G. The Treatment of Dysentery, Journ. Trop. Med., London, 1904, vol vii., pp. 231-5.

Cain, J. S. Acute Sporadic Dysentery, *Med. Age*, Detroit, 1904, vol. xxii., p. 245.

Conradi, H. Ueber eine Kontaktepidemie von Ruhr in der Umgegend von Metz, *Festschr. z.* 60. *Geburtst. v. Robert Koch*, Jena, 1903, p. 551.

Cooke, A. B. Chronic Dysentery: a Protest, *Trans. Med. Soc. Tennessee*, Nashville, 1904, vol. lxxi., pp. 240-7.

Craig, C. F. The Complications of Amœbic and Specific Dysentery, as observed at Autopsy; an analysis of one hundred and twenty cases, *Amer. Journ. Med. Sc.*, Philadelphia and New York, 1904, n. s., vol. cxxviii., p. 145.

The Pathology of Chronic Specific Dysentery of Tropical Origin, *Journ. Ass. Mil. Surg.*, Carlisle, Pa., 1904, vol. xiv., p. 353.

Duval, C. W. Another Member of the Dysentery Group, *Journ. Amer. Med. Assoc.*, Chicago, 1904, vol. xliii., p. 381.

Escomel, E. E. Algunas consideraciones sobre la causa etiológica de las disenterias, *Crón. méd.*, Lima, 1904, vol. xxi., p. 93.

Eyre, J. W. H. A Comparative Study of the Bacilli of Dysentery, *Edinb. Med. Journ.*, 1904, n. s., vol. xv., p. 489.

Asylum Dysentery in Relation to B. Dysenteriæ, *Brit. Med. Journ.*, London, 1904, vol. i., p, 1002.

Fisch, R. Ueber die Behandlung der Amöbendysenterie und einige andere tropenmedizinische Fragen, *Arch. f. Schiffs-u. Tropen. Hyg.*, Leipzig, 1904, vol. viii., p. 207.

de Freitas, O. A dysenteria epidemica, *Brazil med.*, Rio de Janeiro, 1904, vol. xviii., p. 150.

Gaston. Considérations pratiques sur la dysenterie, *Gaz. méd. de Nantes*, 1904, 2 s., vol. xxii., p. 311.

Hartsock, F. M. The Dysentery of the Tropics, with Special Reference to our Insular Possessions, *New York Med. Journ.* [&c.], 1904, vol. lxxx., p. 107.

Hastings, R. W. A Clinical Study of the Bacillus Dysenterie in Boston and Vicinity, *Journ. Amer. Med. Assoc.*, Chicago, 1904, vol. xlii., p. 1121.

Head, G. D., and **Ulrich, H. L.** Some Notes on a Case of Chronic Dysentery with Amœbæ coli in the Stools, *Northwest Lancet*, Minneapolis, vol. xxiv., p. 249.

Heartsill, O. M. Dysentery, *Med. Recorder*, Shreveport, La., 1904, vol. i., p. 183.

Hewlett, R. T. The Etiology of Dysentery and of Infantile Diarrhœa, *Journ. State Med.*, London, 1904, vol. xii., p. 229.

Howland, J. The Pathological Anatomy of Shiga Bacillus Infection of the Intestine in Infants, *Med. and Surg. Rep. Presbyterian Hosp.*, New York, 1904, vol. vi., p. 71.

Jehle, L. Ueber den bakteriologischen Befund bei Dysenterien im Kindesalter, *Mitt. d. Gesellsch. f. Inn. Med. u. Kinderh. in Wien*, 1904, vol. iii., p. 37.

Kazarinow, G. N. Ueber die Rolle des Shiga-Bazillus als Erreger der Dysenterie; experimentelle Untersuchung, *Arch. f. Hyg.*, Munchen and Berlin, 1904. vol. l., p. 66.

Kochler, L. The Treatment of Dysentery in the Tropics, *Therapist*, London, 1904, vol. xiv., p. 113.

Köhler. Eine neue Therapie bei Dysenterie, *München. med. Wchnschr.*, 1904, vol. li., p. 684.

Krul, R. De persloop te Harlingen in 1779; Dr. Simon Stinstra e. a. herdacht, *Geneesk. Courant.*, Amsterdam, 1904, vol. lviii., pp. 264-6.

Kruse. Aetiologie und Prophylaxe der Ruhr, *Ztschr. f. ärztl. Fortbild.*, Jena, 1904, vol. i., p. 339.

Kühnemann, G. Neuere klinische Erfahrungen über Ruhr. *Deutsche Med.-Ztg.*, Berlin, 1904, vol. xxv., p. 377.

Longfellow, R. C. The Etiology and Treatment of Dysentery, *Toledo M. and S. Reporter*, 1904, vol. xxx., pp. 543-52.

Osborn, S. Amœbic Dysentery, Trichomonas intestinalis, Anchylostomum duodenale and Tricocephalus dispar in the same Patient, *Physician and Surg.*, Detroit and Ann Arbor, 1904, vol. xxvi., p. 164.

Park, W. H., and **Collins, Katherine R.** Dysentery Bacilli grouped according to their Agglutination with Sera rendered specific by the elimination of the less specific group agglutinins through absorption, *Proc. N. York Path. Soc.*, 1903-4, vol. iii., p. 213.

Pel, P. K. Ueber tardive Leberabscesse nach tropischer Dysenterie, *Berl. klin. Wchnschr.*, 1904, vol. xli., p. 356.

Raczynski, J. On the Etiology of Dysentery, with an Account of two Epidemics in Galicia in 1903, *Przegl. lek.*, Krakow, 1904, vol. xliii., pp. 255, 275.

Rautenberg, E. Zur Bakteriologie der Ruhr, *Centralbl. f. Bakteriol.*, &c., 1. Abt., Jena, 1904, vol. xxxvi., p. 368.

Rosenthal, L. Ein neues Dysenterieheilserum und seine Anwendung bei der Dysenterie, *Deutsche med. Wchnschr.*, Leipzig and Berlin, 1904, vol. xxx., p. 691.

Rubiao, Meira. Un caso grave de dysenteria: cura, *Gaz. Clin.*, S. Paulo, 1904, vol. ii., pp. 66-71.

Sacquépée. Dysenterie sporadique finistérienne; sa nature bacillaire spécifique, *Bull. Soc. scient. et méd. de l'ouest*, Rennes, 1904, vol. xiii., p. 335.

Shibayama, I. Examination of a House having a Case of Dysentery, *Tokyo Iji Shinshi*, 1904, p. 983.

Shiga, S. Researches on the Etiology and Diagnosis of Dysentery, *Gun Igaku Kwai Zasshi*, Tokyo, 1903, p. 922.

Springfield. Die Ruhrseuchen im Regierungsbezirk Arnsberg, *Klin. Jahrb.*, Jena, 1904, vol. xi., pp. 407-36.

Steffenhagen, Karl. Ueber einen Fall von Amöbendysenterie mit sekundärem Leberabscess, München, 1903, C. Wolf & Sohn, 36 pp. 8vo.

Tayler-Jones, Louise. Dysentery, a Report of Several Cases in which Bacillus dysenteriæ (Shiga) was found in Washington, D. C., *Journ. Amer. Med. Assoc.*, Chicago, 1904, vol. xliii., p. 12.

Trost, A. Ein Beitrag zur Präventivbehandlung der infectiösen Ruhr der Kälber, *Ztschr. f. Thiermed.*, Jena, 1904, vol. viii., p. 291.

Vollbracht. Fall von Amoebenenteritis, *Mitt. d. Gesellsch. f. inn. Med. u. Kinderh. in Wien*, 1904, vol. iii., p. 160.

Vossius, A. Bemerkungen zu der Arbeit des Dr. B. Markwald Ueber seltene Complicationen der Ruhr., *Ztschr. f. Klin. Med.*, Berlin, 1904, vol. liv., p. 163.

Wladiniroff. Ueber Neporoskny's Untersuchungen der Dysenteriebazillen, *St. Petersburgh med. Wchnschr.*, 1904, vol. xxix., 251.

BERI-BERI.

Austregesilo, A. Reflexos patellares exaltados e desdobramento da 1ª bulha no beri-beri, *Brazil-med.*, Rio de Janeiro, 1904, vol. xviii., p. 231.

van der Burg, C. L. Prophylaxie du béri-béri, *Janus*, Amsterdam, 1904, vol. ix., p. 230.

Bushnell, F. G. Acute or Pernicious Beri-beri, *Brit. Med. Journ.*, London, 1904, vol. i., p. 1427.

De Renzi, E. Un caso di beri-beri, *N. Riv. clin.-Terap.*, Napoli, 1904, vol. vii., p. 113.

Duque Estrado, H. Hematologia do beri-beri, *Brazil-med*, Rio de Janeiro, 1904, vol. xviii., p. 153, 165.

Dykes, C. An Outbreak of True Beri-beri in an Assam Jail, *Indian Med. Gaz.*, Calcutta, 1904, vol. xxxix., p. 201.

Gerrard, Percy Netterville. Beri-beri: its Symptoms and Symptomatic Treatment. An Essay printed by the Board of Trinity College, Dublin, for the author, London, 1904, J. and A. Churchill, 104 pp., 1 tab., 1 ch., 8vo.

The same. Being Extracts from an Essay on Beri-beri, printed by the Board of Trinity College, &c., London, 1904, J. and A. Churchill, 61 pp., 1 tab., 12mo.

Janssen. De l'étiologie du béri-béri, *Caducée*, Paris, 1904, vol. iv., p. 134.

Kashkadamoff, V. P. Beri-beri, *Vrach. Gaz.*, St. Petersburg, 1904, vol. x., p. 741.

Lavinder. Beri-beri on Bark Foohng Luey, pub. *Health Rep. U.S. Mar. Hosp. Serv.*, Washington, 1904, vol. xix., p. 1605.

Nocht, B. Ueber Segelschiff Beriberi, *Festschr. z. 60. Geburtst. v. Robert Koch*, Jena, 1903, p. 203.

Paranhos, U. Notas sobre o tratamento do beri-beri, *Rev. med, de S. Paulo*, 1904, vol. vii., p. 138.

Peres Rodriques, S. Epidemia de beri-beri em Loanda, *Med. Contemp.*, Lisbon, 1904, 2 s., vol. vi., p. 246.

Sugai. Ueber Venenphaenomene bei Kakke (Japanese text, Ausz., Hft. 8), *Mitt. d. med. Gesellsch. zu Tokyo*, 1904, vol. xviii., p. 410.

Tanaka, T. The Digestive Canal in Beri-beri, *Iji Shinbun*, Tokio, 1904, p. 369.

Uchermann, V. Ist Beri-Beri ein einheitliches Krankheitsbild? *Zentralbl. f. innere Med.*, Leipz., 1904, xxv., p. 617.

Wakii, E. Ein Fall von Kakke mit Schwerhörigkeit (Japanese text), *Shinkeigaku Zasshi*, Tokyo, 1904-5, vol. iii., p. 22.

Ueber Harncylinder bei Säuglingskakke (Japanese text, Ausz., Hft. 5), *Mitt. d. med. Gesellsch. zu Tokyo*, 1904, vol. xviii., p. 226.

Wright, H. Beri-beri in Monkeys, *Brain*, London, 1903, vol. xxvi., p. 488, 1 pl.

Original Communications.

NOTES ON SOME COLLECTIONS OF MOSQUITOES RECEIVED FROM ABROAD.

I.—A Revised Tabulation of the Genus Tæniorhynchus, Arribalzaga.

By G. M. Giles, M.B., F.R.C.S.
Lieut.-Col. I.M.S. (Retd.).

The genus *Tæniorhynchus* is a fairly natural one, and though the definition originally proposed by the Argentine dipterologist leaves much to be desired, it appears that he recognised better the *facies* of the genus he wished to mark out, as evidenced by the species he grouped together under the name, than has been effected more recently by the revised definition published by Mr. Theobald in his monograph, as, unless that definition be applied in a most elastic spirit, it leads to the separation from the genus of some species obviously allied to others, its accepted members, and which are obviously congeneric, and in some cases most typical of the *facies* one has before one, and for which one desires to find characters which will grasp them together into a natural whole. As a matter of fact, it is the too great emphasis that is laid on the *form* of the wing-scales in Mr. Theobald's definition that has led to its failure to group together a sufficient number of species into a natural and sufficiently comprehensive genus. Now, the essential character of the scaling of the wing in this genus is certainly not the form of the tips of the scales, but the fact that a large proportion of the scales of the veins, which in typical *Culex* would be short and broad, are in these mosquitoes as long as the laterals, or, at any rate, approach them in length, a circumstance which gives a characteristic plumose appearance to the venation which, once recognised, will hardly be missed. A considerable proportion of the veins should certainly be "densely scaled" in this manner, but it would be a mistake to insist on all of them being so, as to do so would lead to the rejecting of several desirable recruits. The typical form of scale is, of course obovate, or lanceolate with blunted tips; and in all the species included in the list given below a larger or smaller proportion of such scales will be found; but to insist on all the scales having this outline would result in leaving the genus without any species at all; and if we adopt the opposite extreme, we must needs include *Culex pipiens*, as that species possesses quite a respectable number of "characteristic *Tæniorhynchus* scales" on the first longitudinal. Hence the forms enumerated below include some that no doubt approach *Culex* on one hand, and on the other some, such as *T. faciolatus*, might almost, with equal propriety, be placed in *Mansonia*. As will be seen, I quite reject the needless and confusing one species genus, *Lutzia*, though it is difficult to understand why Mr. Theobald left his *L. Bigotti* (Bellardi) in solitary magnificence, as, apart from details of coloration, Noé's *C. mimeticus* agrees with Bellardi's species almost scale for scale; and, whether *Lutzia* stand or fall, there can be no doubt whatever that the two species are congeneric. The characters of the palpi are also important. In the ♂ they are much longer than the proboscis, very much tufted, with two minute basal joints, the third very long, and the fourth and fifth together about the length of the third. There is an appearance of thickening near the end of the appendage. In the ♀ the third joint is also the longest, and the fifth is so minute that, except by special bleaching and treatment with potash, it is as a rule impossible to make it out. Characteristically, the third and fourth joints are of obconical form. A further character of some importance is the preponderance of the mid lobe of the scutellum, the lateral lobes being almost obsolete. I also include *C. concolor*, Desv., as, though the wing-veins are rather "scraggy," they are well provided with obovate scales and the palpi of the species, and its general *facies* are quite characteristic.

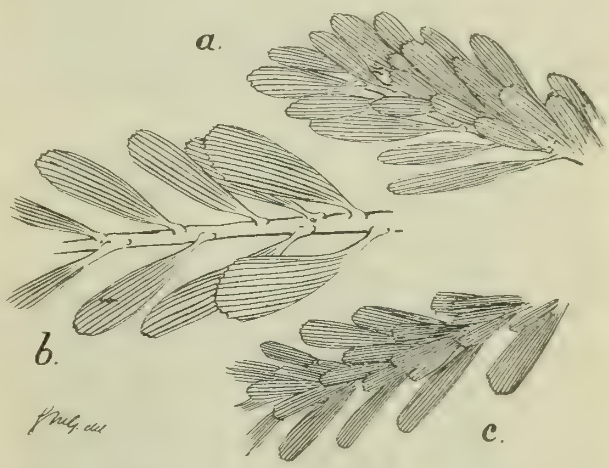

Fig. 1.—Wing-scales in *Tæniorhynchus*. *a*, In typical form; *b*, in *T. fasciolatus*, Arribál., approaching *Mansonia* type; *c*, in *T. Antiguæ, sp. n.*, approaching *Culex* type.

In the plumose character of the wing-veins the genus agrees also with Neveu-Lemaire's new genus, *Theobaldia*, but these gnats are sufficiently separated by their clubbed ♂ palpi, their tufted wings, and by the wing-scales being almost uniformly acutely lanceolate; besides which, they lay their eggs in rafts, whereas in the only Tæniorhynch whose eggs are known they are laid separately in curved rows, and are shaped like champagne bottles.

With the increasing number of species the existing tabulation has become unsatisfactory, and on this account it will be convenient to offer an improved table, including all the species at present to hand.

There are two characters, either of which will divide the species now tabulated into two fairly equal groups. These are the presence or absence of banding of the proboscis, and the brindling or otherwise of the wings. Of the two, as the more easily recognised character, the former will perhaps serve better as the basis of a table. In speaking of banding of the proboscis, it must be understood that a pale ring in the continuity of the organ is understood, a pale tip being not, for present purposes, counted as a band. The only cases in which difficulty might arise are such as that of *T. fuscopennatus*, where the band is so broad

that merely the absolute tip and base are left dark tinted. Such cases, however, are tabulated below as with banded proboscis.

The second character, that of brindling of the wings, is equally valuable, but requires close observation for its accurate recognition, owing to which this character is wrongly recorded for several species in the British Museum monograph, and also in some cases in my handbook. In fresh specimens, however, there is usually little difficulty in the matter, provided the wing be examined under a sufficient magnification, and that care be taken to alter the character of the illumination a few times before coming to a conclusion on the matter. By "brindling" I mean the mixture of scales of contrasted colours, neither of which is aggregated in sufficiently large masses to form definite spots. In certain cases, such as *T. tenax*, where there are but few pale scales on the hinder veins, doubt may be felt, but such cases should be counted as brindled. Another practicable division is that into generally yellow, and sombre-tinted species, but this being less easily definable is relegated to a secondary place in the present table:—

GENUS TÆNIORHYNCHUS, ARRIBÁLZAGA (MODIFIED).

I. Species whose proboscides exhibit a paler band.
  A. With spotted wings.
    a. With the abdomen basally pale banded.
      iii. With the tarsi banded on the articulations.
        1. *T. mimeticus* (Noé). Wing with three yellow spots, rather smaller than the black portions intervening; fringe has a pale spot opposite anal cell. The general grouping of the scales is typical, but scales of characteristic form are found only on I. and about tips of the veins. Band on proboscis broad, yellow; distal black part shorter than the basal. The tarsal articular banding is narrow and commences on the tibio-tarsal joint. Abdominal banding pale yellow, rather narrow, sometimes taking the form of triangular patches on the anterior segments. A highly variegated species, closely counterfeiting an *Anopheles*, and having the venter pale, with V-shaped dark lines across the segments.
    b. With the abdomen apically pale banded.
      iii. With the tarsi banded on the articulations.
        2. *T. Bigotii* (Bellardi). Wings much resemble those of preceding species, but the pale portions of the costa exceed the dark interruptions in length, and the fringe is prominently spotted at each junction. The grouping and general form of the scales are also closely similar, but there is a larger proportion of typical bluntly lanceolate scales. The proximal limit of the band of the proboscis is so ill-defined that it would be better described as yellow, darker at the base, and with a rather narrow subapical black band. Abdomen brindled deep brown and orange, with creamy triangular apical median patches and posterior edges on each segment. All the last tarsal joints are more or less pale orange, and the articular banding very wide, and includes even the tibio-femoral articulation. Perhaps the handsomest and largest of all mosquitoes, with the venter adorned almost precisely as in the preceding species. The eyes show a peculiar sooty stellate spot in the middle.
  B. With the wings brindled but not actually spotted.
    a. With the abdominal segments basally pale banded.
      i. With the tarsi basally pale banded.
        3. *T. perturbans.* Wing brindled whitish, especially near base. Band on proboscis ill defined, placed in the middle. A sombrely tinted species. A white ring on the middle of the first tarsal and another on lower third of tibia; tarsal banding white.
        4. *T. tenax*, Theob. Wing barely perceptibly brindled with a few scattered white scales on inner veins. Proboscis with conspicuous pale band beyond the middle. Position of abdominal banding difficult to determine on account of a few white scales on apices of segments; first tarsal joints not noticeably banded. A sombre-tinted species. Thorax golden scaled in front, black scaled behind, with four rows of strong black bristles.
    b. With the abdomen apically pale banded.
      i. With the tarsi basally pale banded.
        5. *T. fuscopennatus*, Theob. Brindling of wing fairly uniformly yellow and black, but mainly the latter. The pale "band" on proboscis occupies most of its length, leaving only just base and apex black. Abdomen with white apical spots rather than bands. The yellow tarsal banding is very broad, leaving only black tips. A generally yellow-tinted species; venter almost uniformly yellow.
        6. *T. Antiguæ*, Giles. Wing brindled throughout with about equally distributed black and pale yellow scales, the latter almost forming spots on some inner veins. Inner rank fringe scales alternately light and dark. Band on proboscis broad yellow, not sharply defined, placed in middle. Abdominal segments dark, with conspicuous triangular apical snowy bands, and occasionally some lateral spots in front. All tarsal joints except last two of fore and mid pairs with narrow yellow basal bands. Thorax dark, with golden-brown curved scales. A sombre species, with snowy apical bands on the dark venter and a pale subapical band to all the femora.
      iii. With the tarsi banded on the articulations.
        7. *T. ager*, Giles. Proboscis with narrow ochreous band on the middle and pale tip. Wing richly brindled throughout, black and ferruginous. Abdominal apical banding broad and ferruginous. First tarsal joints with narrow basal and a median ferruginous ring, in addition to the apical component of the articular banding. Thorax dark brown, with a lighter broad-arrow-shaped patch in the middle. A sombre-tinted species.
        8. *T. fasciolatus*, Arribál. The brindling of the wing is especially marked on I., and almost amounts to spotting about the cross-veins and forkings. Band on proboscis broad, creamy white, situated about its middle; apex also pale. Abdominal segments black, with fulvous hinder edges. Thorax brown, with four lines of white scales behind and a golden line in front. A generally sombre species, with white knee and tibio-tarsal spots, and a white subapical ring on the femora.
  C. The scales of the wing uniformly of one colour, or at any rate not brindled.
    a. With the abdominal segments basally pale banded.
      i. With the tarsi basally pale banded.
        9. *T. niger, sp. n.* Wing black. Band of proboscis sharply defined, rather narrow, placed at the middle. Abdominal segments sooty, with narrow white bands of uniform width. Tarsal banding extremely minute, especially on distal joints. Thorax sooty-grounded, with deep golden-brown curved scales, rather paler at the sides behind. A very sombre species, with apical lateral spots to the abdominal segments, not visible from above, and the venter impure white, with narrow black bands across the apices of the segments.
    b. With the abdominal segments apically pale banded.
      i. With the tarsi basally pale banded.
        10. *T. confinnis*, Arribál. Wings brown, with small scales. Pale band of proboscis variable, usually broad. Abdominal banding narrow and white. Tarsal banding broad. Thorax with a round pale spot in front and triangular ones at the sides. A sombre species, with pale knee and tibio-tarsal spots, and rows of yellow dots on the femora and tibiæ.
    c. The abdomen marked with a median pale line.

i. With the tarsi basally pale banded.

11. *T. Whitmorei*, Giles. Wing uniformly dark. Band of proboscis broad and yellowish, placed beyond the middle. The ornament of the abdominal segments consists of a median area, broad in front and tapering almost to a point behind. Tarsal rings barely perceptible. A very sombre species, with the femora mottled with black and white scales, but no knee or tibio-tarsal spots, and the venter impurely white scaled.

d. With the abdomen unbanded.

i. With the tarsi basally pale banded.

12. *T. Arribálzagæ*, Theob. Wing dark. Ring on proboscis minute, white, well *outside* its middle. Abdomen sooty. Tarsal banding snowy. Thorax deep brown, with some snowy adornment. A sombre species, with whitish *basal* bands on the venter, and yellowish subapical rings on the fore femora, the others being merely spotted in this situation.

13. *T. Goeldii*, Theob. Wing dark. Proboscis brindled, with a broad faint band rather *inside* its middle. Abdomen dark. Tarsal banding snowy. Thorax clothed with brown and golden scales. A sombre species, with indistinct *apical* pale bands on the venter, and the femora and tibiæ brindled, but without definite ornament.

II. Species with the proboscis unbanded.

B. With brindled wings.

a. With the abdominal segments basally pale banded.

i. With the tarsi basally pale banded.

14. *T. conopas* (Frauenfeld). Brindling of wing not very conspicuous, consisting mainly of brown scales, with some yellow; the ground colour of the wing being also yellow. Proboscis orange-yellow, dark at tip. Abdominal yellow pale bands occupy most of the area, the hinder edges of the segments alone being brown. The orange tarsal bands occupy more than the basal half of the joints. A bright orange-tinted species, with the venter marked in the same way as the dorsum of abdomen, and the femora and tibiæ brindled yellow and brown, except at the tips, which are dark. Ground of thorax pale, with dark lines and spots.

ii. With the tarsi apically pale banded.

15. *T. fulvus* (Wied.). Wing brindled yellow and black; the former preponderating along the costa internally, the latter on the tip and on V. and IV., but there is no definite spotting, as the tints shade off into each other. Proboscis brownish-yellow, with darker tip. Abdomen fulvous, the hinder border of the segments with dark brown apical bands from second to sixth in male, and second to fourth in female. Tarsi brindled yellow and black, just infuscated at the tips and on the hind tarsi with sharply contrasted bands of varying widths, the basal three-fourths of the first joint being pale, and the others to a less extent so. Thorax pale grounded, with four dark oval spots, the inner placed lengthwise, the outer athwart the back of the mesonotum. A generally yellow-tinted species, with the venter pale and the femora and tibiæ deep orange, with sharply contrasted black tips.

a. With the abdomen unadorned.

i. With the tarsi basally pale banded.

16. *T. Richardii* (Ficalbi). Wing mainly dark, but brindled yellow about the middle and on some of the hinder veins. Proboscis brindled yellow and black, the latter preponderating at base and tip, but not sufficiently to form a band. Abdomen dark, rather paler at the base of the segments. Tarsal banding white, especially broad and distinct on some of the distal joints. Thorax dark grounded, with a tendency to a linear adornment of three lines of golden scales. A rather sombre species, with a white band on the middle of the first hind tarsal joint and a subapical black one on the generally yellowish femora. The male has the abdomen much brindled, with a tendency to spotting and apical banding of the hinder segments.

C. With the wing-scales uniformly tinted.

a. With the abdominal segments basally pale banded.

i. With the tarsi basally pale banded.

17. *T. aurites*, Theob. Wing uniformly honey-yellow. Proboscis all yellow but for a dark tip. The abdominal segments are all yellow but for a narrow band of purple-brown scales across their apices. First two hind tarsal joints with extremely broad yellow basal bands, the last three almost entirely dark; fore and mid tarsal joints all yellow but for dark tips. Thorax with ground and scales alike yellow-brown. A bright yellow species, with a rather narrow black band across the middle of the hind tibiæ, and the venter all yellow, but for a row of dark median apical spots on all but some of the hinder segments. Female palpi brown at tip only.

18. *T. Annettii*, Theob. Wing very pale yellow, not brindled. Proboscis yellow, black at apex. Abdominal segments indistinctly banded, their bases being ferruginous and their apices yellowish-brown. Bases and most of length of tarsal joints yellow, with short feebly-contrasting brown tips. A pale yellow species, with a little brown on the hinder edges of the segments of the yellowish venter, the hind tibiæ with a narrow brown ring, and the tips of all the femora almost black. Female palpi brown at base and tip.

iii. With the tarsi unbanded.

19. *T. brevicellula*, Theob. Wing ferruginous-brown. Proboscis brown. Abdominal segments deep purple, with narrow basal ferruginous bands, broadening externally. Legs uniformly dark. Thorax dark grounded, with golden scales and two purple patches behind. A rather sombre species, with the venter brownish-yellow, with paler basal bands, and the female palpi almost entirely brown.

20. *T. acer* (Walker). Wing dark scaled. Proboscis black. Abdominal segments brown, with yellowish-brown basal lateral spots, usually joining to form bands. Legs black, except the yellow coxæ and bases of femora. Thorax dark grounded, with yellow scales very light in front. A very sombre species, with the venter rather lighter, with ill-contrasted basal bands and the female palpi entirely dark.

b. With the abdomen apically pale banded.

iii. With the tarsi unbanded.

21. *T. concolor* (R. Desv.). Although it cannot be called banded, the proboscis, which is brindled ferruginous and black throughout, is distinctly darker at the base and tip. The wing-scales are all dark brown and not very characteristic generally, though obovate scales preponderate. Abdomen deep ferruginous, its creamy bands narrow. Legs, including the tarsi, and the palpi in both sexes, brindled dark and light ferruginous throughout. A singularly uniformly coloured brown species, with the venter brindled white and pale brown occasionally, with some irregular darker marking.

c. With the abdomen unbanded.

iii. With the tarsi unbanded.

22. *T. ochraceus*, Theob. Wings, proboscis, abdomen, legs and thorax bright yellow throughout. An exceptionally uniformly and brightly tinted species, the only characteristic markings being dark tips to the tibiæ and femora. The fork-cells are rather shorter than usual.

II.—Descriptions of some New Culicidæ.

As a result of a re-sorting of my collection, the following new forms have come to light, including one, *C. fuscanus*, Wied., which has for some time held a merely nominal position, unrepresented by any actual specimen. To avoid needless repetition, in the case of the two new *Tæniorhynchi* included in the preceding table, only those characters are mentioned which are not included in the tabular diagnosis.

Tæniorhynchus Antiguæ, sp. n. Supplementary characters.

♀. Head dark grounded, with straw-coloured, curved and erect forked scales on occiput and nape, and the lateral flat-scaled areas brindled black and yellow; palpi almost entirely dark scaled. Pleuræ not spotted. Legs and proboscis more or less brindled throughout. Venter black, with narrow snowy apical bands. Of medium size.

Habitat.—Antigua.

Somewhat resembles my *Tæniorhynchus ager*, but the abdominal banding is quite different. The proboscis wants the yellow tip, and its middle band is much broader. The sub-apical bands on the thighs are also very characteristic.

Tæniorhynchus niger, sp. n. Supplementary characters.

♀. Head with a median area on the occiput clothed with golden falciform scales like those of *Howardina*, and also with two strong brown bristles projecting forwards between the antennæ. Nape densely clothed with yellow and brown forked scales; lateral flat-scaled areas with a black spot behind the eyes enclosed in a loop of white. Palpi brown, with white tips. Scutellum with yellowish falciform scales; pleuræ and coxæ with some whitish bars and specks. Halteres entirely pale yellow, densely scaled.

This species closely resembles *C. impellens*, Walker, in ornament, but differs in having snowy apical lateral spots on all but the last abdominal segment; *C. impellens* having simply basal bands, besides which, of course, the dense scaly armature of the wing, though the scales are rather narrow for the genus, is alone sufficient to distinguish them. Rather over medium size.

Habitat.—Antigua. July 21st, 1901, from a collection sent by Dr. Forrest.

Howardina Himalayana, sp. n. Wing dark scaled, unspotted, with rather short fork-cells. Tarsi uniformly sooty. Thorax sooty-grounded, densely clothed with golden long curved scales, which do not appear disposed so as to form any definite adornment. Abdomen sooty, with brilliant snowy basal bands, which expand laterally to form distinct outstanding tufts.

♂. Head sooty grounded, with a nude median line, flanked on either side with obliquely-directed falciform and erect forked scales (as if its hair had been parted), but with no forked scales in the fore part of median band. Outside this are similarly scaled black patches, and outside these, again, alternate patches of white and black flat scales. Palpi black, much tufted, rather longer than the proboscis. Scutellum black, with three patches of white falciform scales, grouped round the bases of dense tufts of long yellow hairs. Pleuræ with some white patches. Legs a warm deep brown, with minute yellow knee spots, and the bases of the femora pale brown throughout. Venter yellow. A medium-sized mosquito.

Habitat.—Naini Thal, in the Himalayas. Bred in August, from a clear pool beneath a waterfall.

This species presents much resemblance to Mr. Theobald's genus *Howardina*, but has perhaps too large a proportion of erect forked scales on the head. In *H. Greenii*, however, forked scales are present on the nape, and assuming the genus to be retained, it would be difficult to exclude the present form.

Culex fuscanus, Wied. Among my collection I find a specimen contributed by Dr. S. Cropper, from Sidon in Asia Minor, which corresponds with all the recorded characteristics of Wiedemann's species.

The insect is a Culex of almost uniform fuscous coloration. The wing is hyaline, with a very scanty armature of linear scales. Tarsi fuscous, unbanded. Abdominal segments very dark, with narrow grey apical bands, which almost expand into spots laterally. Thorax brown grounded, with four darker lines clothed with pale yellow curved scales in front, and golden ones especially dense about the roots of the wings behind.

♂. Head with creamy narrow curved and erect forked scales and lateral flat-scaled patches of the same tint. The proboscis is peculiar, disproportionately stout throughout, and quite spatulate at the end. The palpi but slightly exceed the proboscis in length, and are clothed with smooth brown scales, with a few pale ones near the base. Pleuræ clothed with golden scales. The legs are yellowish-fuscous, with a minute paler spot on the knee and apex of the tibia. A small species.

Habitat.—Sidon, Asia Minor. Wiedemann records it from the "East Indies," and Wallace from Singapore, Sarawak, &c., but nothing corresponding sufficiently well to be identified with Wiedemann's description has, so far as I know, been received at the British Museum.

MARKING OF THE TONGUE AN EARLY SYMPTOM OF ANKYLOSTOMIASIS.

By A. J. B. Duprey, M.R.C.S., L.R.C.P.Lond.
St. Lucia.

Dr. P. H. Delamere, of British Guiana, has propounded such an important theory in reference to the early diagnosis of ankylostomiasis that the question cannot be dealt with in a summary fashion, but should be considered with the utmost care and patience by those who are interested, and who have the opportunity of observing every case that presents itself for examination.

The pigmentation of the tongue, which he described so graphically in the Journal of June 16th, 1902, as constituting an early symptom of ankylostomiasis, raises an interesting point in the pathology of the condition—namely, the identity of the markings on the tongue of living patients, with the pigmentation of other organs in the cadaver, such as were found and described by Dr. Daniels in subjects of ankylostomiasis. Are the markings on the tongues of such patients really due to a pigmentation? It seems to me that this is an important point to be settled—that is to say, whether these discolorations are really a deposit of pigments or a merely staining of the mucous membrane of the tongue. My experience leads me to believe that the markings are simply stains produced mechanically by the Indian habit of chewing the Phan. With all due respect to the investigations of Dr. Leonard, of Grenada, backed by his several years of experience in India, I still submit that the juice of the Phan leaves do stain not only the tongue, but the palate, gums and teeth of the Indians, and most probably also the mucous membrane of the stomach. Moreover, I have consulted a few intelligent Indians, and they emphatically uphold my contention. Soon after the appearance of my paper in the Journal of Tropical Medicine of September 1st, 1902, a correspondent wrote to corroborate my observations, and further added that the Phan leaves were often mixed with a gummy substance known to Indians as "missee," and invariably with catechu. I have recently sought the opinion of an Indian gentleman on the subject, and his description more than strengthened my opinion as to the mechanical manner in which these markings are produced. He said: "All Indians, from the highest to the lowest caste, chew the Phan; and the way they do it is by wrapping a piece of catechu with a pinch of slaked lime in the leaf of the Phan, and chew the mixture." He further added that the Phan is used for its antiseptic and stomachic properties.

Dr. Leonard will allow me, I am sure, to point out his mistake in supposing that the coolies, who are still addicted to the habit, have no opportunity of indulging in their cherished practice. The "Phan" is not indigenous to the West Indies, but was originally brought from India by immigrant coolies, so that the coolie, wherever he goes, carries this luxurious plant with him. This is the history of the Phan, which is to be found in nearly all the West Indian Islands; and a good many more Indian plants are to be found in these Islands, owing to the migration of the coolie.

Though the coolies of Grenada have to some extent

given up the practice, yet I know that the Phan flourishes there. It can be found also in St. Lucia, especially in coolie settlements, although I have not been able to find it in this district. Certainly in all the Islands where there have been immigration of coolies the Phan will be found.

The Reverend Abbé Dus, of Guadeloupe, in his most valuable book, "Flore Phanérogamique des Antilles Françaises," mentions the Phan as flourishing in Martinique and Guadeloupe. Its scientific name is *Momordica charanti*, or otherwise commonly known as concombre-coolis, or pomme l'Indiens; and the Abbé says of the plant: "On emploie souvent, les feuilles et les fruits, écrasés, en tisane contre les fièvres et les dérangements de ventre." Le Professeur Edouard Heckel has also something to say about it. He says: "Cette espece, peu utilisé aux Antilles, l'est d'avantage à la Guyane. Les fruits mûrs, depouillés de leur semences et macérés dans l'huile d'amandes douces, y forment un vulneraire populaire. Les feuilles, contusées et mêlées à un corps gras, donnent un onguent contre la gale et les maladies de la peau." So, therefore, it is plain that the Phan may not only be found in all the Islands of the West Indies, but that its antiseptic and stomachic qualities are well known even to the natives, who must have learnt the virtues of the plant from the Indians.

When in Trinidad I had frequent opportunities of observing this condition, and I have little doubt that the markings are to be found in nearly all new coolies, whether the subject of ankylostomiasis or not. I have never seen the condition so well marked in the native West Indian, although there are some people who have naturally brown spots on their tongues without their health suffering in the least.

Ankylostomiasis, however, is a peculiar disease, which has yet to be well investigated. Observers, for instance, do not all agree as to the exact manner in which the anæmia is produced; and recently I have noticed conflicting opinions on the subject.

At the Colonial Hospital, in Port of Spain, Trinidad, I once systematically examined the fæces of all the coolie and native patients in the wards under my care, and found evidence of ankylostomiasis in nearly all, irrespective of the diseases for which they were admitted. I am therefore inclined to think that most of us living in the West Indies harbour the ankylostomes, although our tongues are not necessarily marked. At the risk of being tedious, I will repeat that the question of ankylostomiasis is, to my thinking, very imperfectly understood, notwithstanding all the writings on the subject. There are yet very important points to be considered, and one of the most essential questions to be settled is this—viz.: Is the disease really and truly an ankylostomiasis—that is to say, are all the concomitant symptoms of the condition produced by the presence of the ankylostomes in the intestines, or are these worms a mere coincident in the course of the disease?

Besides the fact of these worms being likened to leeches, there is now a toxin theory which is being put forth, in an apologetic sort of fashion, as being the whole cause of the trouble.

The anæmia of so-called ankylostomiasis may well be caused by the close confinement of sweated labourers in badly-ventilated mines, combined with bad feeding, or by the inveterate practice of geophagy, such as we observe in the East Indian coolies. It may be a fact well worth knowing that immigrant coolies, on their arrival in the West Indies, do not take agreeably to work, chiefly, I think, through their being greatly disappointed with their contracts, and they develop the habit of dirt-eating purposely, well knowing it will make them ill, thereby necessitating prolonged hospital treatment.

Nov. 13th, 1904.

Plague.

PREVALENCE OF THE DISEASE.

India.—During the weeks ending October 29th, November 5th, and 12th, the deaths from plague in India numbered 15,994, 14,397, and 15,197 respectively.

South Africa: Port Elizabeth.—During the weeks ending October 29th and November 5th, 12th, and 19th, fresh cases of plague numbered 0, 0, 1, and 4; deaths 0, 0, 0, and 1.

Mauritius.—During the weeks ending November 17th and 24th, December 1st and 8th, fresh cases 27, 17, 35 and 25; deaths 13, 13, 25 and 14.

Hong Kong.—During the weeks ending November 12th and 19th, fresh cases 1 and 4; deaths 1 and 4 respectively.

Hamburg.—The s.s. *Blagdon*, detained at Hamburg for fourteen days on account of suspected plague which proved groundless, was liberated from quarantine on November 28th.

Aden.—On November 20th a few cases of plague reported.

Brazil.—Plague prevailed at Pernambuco in October.

Formosa.—During July and August, 1904, the fresh cases 108 and 36, and the deaths 182 and 39 respectively.

Hawaii.—No plague since September.

Plague in the Thames.

On arrival of the steamship *Weybridge* in the Port of London from the River Plate, on November 30th, a member of the crew was found by the medical officer of the Port Sanitary Authority to be suffering from illness which he suspected might turn out to be plague. The vessel was detained at Denton for the removal of the man to hospital and for the necessary disinfection. The malady from which the man is suffering has now been pronounced to be plague by Dr. Klein, who has made a bacteriological examination at the request of the Local Government Board. The man remains under detention at the port hospital near the mouth of the Thames, and meanwhile the vessel and everything in it have been disinfected, and measures taken for destroying rats on board, together with other precautionary proceedings. No passengers arrived by the *Weybridge*. The crew is under surveillance.

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THE

Journal of Tropical Medicine

December 15, 1904.

A NEW DEPARTURE IN SYSTEMATIC MEDICAL TEACHING. FOUNDATION OF LECTURESHIPS IN PROTOZOOLOGY AND HELMINTHOLOGY AT THE LONDON SCHOOL OF TROPICAL MEDICINE.

Amongst the advertisements on p. iii. of the present issue of the Journal will be found announcements inviting applications to fill the newly-created Chairs of protozoology and helminthology, at the London School of Tropical Medicine. The elevation of each of these subjects to the dignity of a Chair in a medical curriculum is a distinct innovation, and a marked advance in systematic medical teaching. Protozoology has, in tropical medicine more especially, grown to such enormous importance and to such wide proportions, that it demands the services of men specially equipped to even keep pace with what has already been done in this field of investigation. The same may be said in regard to helminthology, for anyone who has practised in the tropics is well aware of the multiplicity of worms infecting the blood, the passages, the organs and tissues of men and animals. Hitherto the subjects have been included in the general laboratory work taught in our schools of tropical medicine, but the subject matter has outgrown general instruction, and demands special teachers, special classes and special investigators. That the volume of knowledge in both protozoology and helminthology will still further increase during the next few years is certain; for, thanks to the schools of tropical medicine, the medical men well trained in tropical pathology and in the methods of investigation now working in tropical countries number many hundreds, and the result of their thorough education will be that observations will proceed apace and knowledge accumulate. It is necessary, however, to have an authoritative centre at which all observations may be focussed and sifted; it is necessary, in fact, to create what we do not possess in this country at present, specially trained experts in these subjects, if we are to emerge from the chaos which at present affects us whenever a new protozoan is discovered or an unfamiliar worm found.

By the establishment of these Chairs we hope to see grow up amongst us medical men whom we may regard as authorities in these important subjects, and to whom we may turn in our difficulties. At present we have, no doubt, several zoologists of eminence; but a zoologist, however eminent, cannot cope with all the special demands of modern scientific teaching and investigation. It is necessary, therefore, to specialise; for zoological studies, as they affect the diseases of man and animals, require the close and earnest attention of men—and medical men by preference—who take up the subject as a life-long study.

We welcome, therefore, the far-seeing wisdom of those who have brought about the establishment of these Chairs, and we appreciate to the full the part played by Mr. Lyttelton, the Minister of State for the Colonies, in bringing his influence to bear not only for the creation of these Chairs,

3rd Row:—D. B. Mandhle, Capt. H. W. Grattan, R.A.M.C., John McEwan Dalziel, R. E. McConnell, Henry Joshua Augustine, D. Lydstone, Robert Laurie, Major F. Wyville Thomson.
2nd Row:—Arthur King Bennett, Alexander Bremner, J. Scott Byrne, Capt. Peter Dee, Capt. Eric Harding Sharman, Albin Pihl.
1st Row:—Oliver C. Greenidge, G. F. C. Walker, J. W. W. Stephens (Walter Myers Lecturer on Tropical Medicine). Prof. R. Boyce (Dean). Prof. R. Ross (Prof. of Tropical Medicine). Dr. Christy (Assistant Lecturer). William James Bruce, Anders Prag.

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but in obtaining an ample endowment for their up-keep and continuance. The young men who are fortunate enough to obtain either of these Chairs have an opportunity of distinction, such as few have had granted them. Not only will they be the first in the field, but their remuneration, when compared with that of other men teaching such special subjects as anatomy and physiology in our London schools, will be found to place them in a satisfactory position.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

Reception of the Tropical Expeditions of the Liverpool School of Tropical Medicine at the Colonial Office.

On Wednesday, the 7th inst., the members of the three expeditions which are now being sent out from Liverpool, had the honour of being received in Downing Street by Mr. Lyttelton, the Secretary of State for the Colonies. Before proceeding to Downing Street, the members of the expeditions, and some others interested in the progress of tropical medicine, were entertained at lunch by Sir Alfred Jones, who headed the deputation. There were present: Sir Ralph Moore, Late Governor of Southern Nigeria; Professor Boyce, F.R.S., Dean of the School, who goes in charge of the party proceeding to the northern portion of West Africa; Lieutenant-Colonel G. M. Giles, I.M.S. (retired), who is in charge of the Southern party; Dr. Wolferston Thomas, who heads a party charged with the investigation of yellow fever; Dr. Evans; Dr. Clarke; Dr. McConnell; Dr. A. Breinl, of Prague; Mr. John Holt; Mr. Irvine; Mr. J. O. Strafford, and Professor Caarten, and Mr. A. H. Milne, Hon. Sec. of the School.

An informal conference was afterwards held. Sir Alfred Jones commenced the proceedings by expressing his pleasure at meeting so large and representative a party. He was specially pleased to note the presence among them of two Canadian men of science, who were giving a new evidence of the solidarity of the Empire by leaving the Northern land of their birth to help, at the risk of their lives, their fellow-subjects who were upholding the flag in tropical regions. He was convinced that the possibilities of the further opening up of Africa hinged mainly on the improvement of the sanitary condition of those regions, and as the head of a large European staff employed in commercial enterprise in that part of the world, he was able to speak from personal knowledge of the immense improvement in health that had resulted from the work of the expeditions sent out by the Liverpool School and the Royal Society; but much remained to be done, and in preventive medicine, as in commerce, it was only by a policy of steady pushing that the Imperial and commercial objects could attain their full development. He need hardly say that in wishing them God-speed he hoped to see them return well provided with successful and fruitful results.

Professor Boyce said that was the largest effort the school had as yet made, as no less than three expeditions were starting almost simultaneously, and this in addition to the party still working on the problem of sleeping sickness. Tropical preventive medicine had had to fight against much prejudice and still had to contend with difficulties of that description, but he hoped that their colleagues who were permanently occupied in fighting death and disease in the colonies they were visiting, would understand that they came in no critical spirit, but solely on the principle that several heads were better than one. Colonel Giles, who was in charge of the southern party, was himself an old official, and therefore fully appreciated the difficulties and limitations that hedged round official work, and especially of the fact that the imperious necessities of their routine every-day work really left men very little time for original work, however keen they might be on the advancement of professional knowledge; and he hoped that they would all understand that, far from carping or depreciation, every member of the parties was animated with the sincerest sympathy for the difficulties and dangers with which they were surrounded. He wished to draw attention to the fact that the effort was not only imperial but international, as they were honoured by the co-operation of Dr. Breinl, one of the leading young men of the University of Prague, who had come from Austria to give them the benefit of his assistance.

Sir Ralph Moore said that he was glad to be able to add his testimony to that of Sir Alfred Jones as to the vast improvement that had taken place in West Africa during the time he had known it. Professor Boyce had hinted at the friction that had occasionally appeared between the medical and executive authorities, but it would be wrong to imagine that such difficulties were other than exceptional; and it must be remembered that scientific men, like other folks, were not only fallible, but sometimes rather hasty. He could instance a case which occurred within his own jurisdiction, where the medical officer insisted upon the absolute abandonment of a certain notoriously unhealthy station. Now such a course was as a matter of fact out of the question, as the station was not only indispensable on account of its geographical situation, but an immense amount of capital had been sunk in developing it. Well, the engineers took the place in hand and instituted drainage works, and the place was now one of the healthiest in the territory.

Colonel Giles said that although in the case of yellow fever the presumed parasite still eluded our search, from the point of view of preventive medicine we stood upon as absolutely firm ground as in the case of malaria and filariasis. In the case of malaria, it certainly might now be claimed that there is no disease of which our knowledge is more advanced and complete. Important details no doubt remained to be worked out, but the broad facts were as incontestible as those of Jennerian vaccination. The one difficulty now was to get the public to believe this, and it was mainly from this point of view that gatherings like the present were so useful and important. The Liverpool

School had effected so much mainly because it had convinced the Liverpool merchant, for it was the enlightened co-operation of the great leaders of commerce in our greatest port that alone made these expensive expeditions possible. He had no doubt that the men of the Sister School in London would back up the London men of commerce quite as keenly if the latter could be induced to find for them the sinews of war; but unfortunately, in this matter at least, London undoubtedly fell a long way behind Liverpool. It was most satisfactory to hear from the lips of Sir Alfred Jones, their host, that these strong men of Liverpool could testify that their generous expenditure was already yielding a good return in the shape of the increased efficiency of their European *personnel* working in the Tropics, and he earnestly hoped that "Those in authority over us would soon realise that anti-malarial sanitation was a commercial success, and put some check on the present heavy drain on the exchequer in the item of 'ineffective charges' due to avoidable sickness, invaliding and death."

Dr. Wolferston Thomas said that in attacking once more the problem of yellow fever, he was well aware that no light task was set them. The disease had been already the subject of several special scientific expeditions, manned by the best men of several nations, and he felt it would be presumptuous to say, under the circumstances, that they expected their efforts would be met by success. At the same time they trusted that good luck might attend them, and perhaps put them on the scent where better men failed. In any case they meant to do their level best, and however diffident they might feel, they were determined to spare no effort to attain the objects of the expedition.

Dr. McConnell said how much he felt the cordiality with which he and other Canadians were welcomed by people in the old country when they desired to associate in any field of enterprise. He could only say he would do his best to keep up the credit of the Dominion by pulling hard in the team he had joined.

The Deputation at the Colonial Office.

Sir Alfred Jones, in introducing the deputation, said that the School of Tropical Medicine was first of all started by Mr. Chamberlain, and they had the greatest possible pleasure in following up the movement. They appreciated the sympathy which Mr. Lyttelton had shown in the movement by receiving them, and, in appearing before him that day, he thought they might claim to be perhaps the most remarkable body who had gone forth from this country with the view of improving the health of the people. At the present time they had an expedition on the Congo, which was sent out under the auspices of the King of the Belgians, to study sleeping sickness. Enormous success had been achieved by previous expeditions in reducing the mortality in West Africa. The gentlemen who were going out had volunteered their services, and were willing to risk their lives. The money for the expedition had been subscribed by Liverpool merchants.

Professor Boyce remarked that the movement was Imperial and international. They all looked forward to a great improvement in our tropical possessions. They were going out to seek information, and to co-operate in every way possible with the authorities, rather than to criticise.

Mr. Lyttelton, in reply, said that although the deputation was larger than he had anticipated, that fact did not render it less agreeable to him to welcome the gentlemen who had come, and to wish them God-speed in the journey—a journey, no doubt, of interest and not wholly without some peril to those who were embarking upon it. He was glad to recognise that, in the same way that Canadian teachers had assisted in the first efforts that were made to educate Boer children, they had in the present expedition two Canadian men of science side by side with Englishmen and Scotchmen who are going out to West Africa. It was an outward and visible sign of the cohesion and sympathy of the Empire.

He was also extremely pleased to hear that the expedition was not going out in a spirit of criticism, but in a spirit of helpfulness to those who had so long laboured and had done such admirable work in medical science upon the coasts. It was obvious that all men who had laboured for long under conditions of difficulty, and conditions dangerous to health, must be sensitive to hostile criticism. That criticism, he was sure, they were not going to apply there, but they were going to put their heads together—two heads were better than one—and supplement by fresh observation and research the knowledge which had already been gained in West Africa. He thought he might fairly claim to have endeavoured to promote to the best of his ability the great designs which Mr. Chamberlain had in regard to tropical medicine. It was a subject about which they felt intensely at the Colonial Office, and they were proud to follow the noble traditions which Mr. Chamberlain had set in that office.

Departure from Liverpool.

Professor Boyce, F.R.S., Dr. Arthur Evans, and Dr. H. H. Clarke, who comprise the thirteenth expedition despatched by the Liverpool School of Tropical Medicine to West Africa for purposes of scientific research, sailed from the Mersey on Wednesday, December 14th. On the day before sailing they were entertained to a farewell luncheon by Sir Alfred L. Jones, and a numerous company of Liverpool commercial men were invited to meet them. Sir Alfred Jones, in proposing "Success to the Expedition," said the Liverpool School had accomplished invaluable work in the direction of making the West Coast more healthful and habitable to white men and natives alike. Mr. James Boyle (American Consul) pointed out that Liverpool was rapidly forging to the front as a scientific centre, and both London and Edinburgh would soon have to look to their laurels. Mr. Walter Long, M.P., said that Liverpool and the nation at large owed an incalculable debt to Professor Boyce. In the history of British colonisation and territorial acquisition the most painful page was that in which one read of the death, not of the men who had fallen sword in hand fighting under the flag of their country, but of those countless thousands whose lives had been sacrificed, as they now believed quite unnecessarily, to a deadly and unseen enemy which had wrought such terrible ravages in the past, and which they had every reason to believe could now be vanquished.

Colonial Medical Reports for 1901-02.

Abstracts.

St. Lucia.

Report on Filaria Sanguinis Hominis, by Dr. Otho Galgey.—In my report for 1898 on this subject I expressed the opinion that elephantiasis was not prevalent in St. Lucia. This opinion was formed because cases of "Barbadoes leg" were not frequently seen, and also because the embryo Filaria Nocturna was difficult to find in the blood of *natives* of the Island. In my original inquiry I excluded persons from the Leeward, or Windward Islands, and confined my observations strictly to those who were born here, and who had never lived elsewhere. Hence I came to the conclusion that there was very little indigenous Filaria Nocturna in St. Lucia - in fact, that the disease was not endemic, as is evidently the case in Barbados, Antigua, Nevis, St. Kitt's, and other Islands. In the larger Colonies of Demerara and Trinidad elephantoid diseases are also very prevalent. Subsequent study, with improved appliances, has modified some of the views expressed in 1898, as it is now evident that the difference noticed in the size of the embryo Filaria Nocturna was more apparent than real. It depended in a great measure on the thickness of the blood film, and on the degree of contraction of the worm while dying, and not on any permanent difference in the size of the living worms sufficient to constitute another variety. There is but one species of Filaria Nocturna met with in the West Indies.

Revision of the subject tends to confirm the opinion that Filaria Nocturna, the cause of elephantiasis, is not very prevalent here at present *among natives*, but there is a possibility of its extension in the near future owing to the large number of immigrants from infected islands who continue to swarm to St. Lucia in search of work. Every new case arriving in the island becomes a focus of infection, and therefore a source of danger to all, as our common house mosquito (the Culex Fatigans) is the acknowledged "intermediate host," or disseminator of the disease.

I have lately met with cases of elephantiasis of a rare variety in natives, which would seem to point to the conclusion that the disease is *more prevalent* than it was in 1898. I have also collected an interesting series of photographs of cases of elephantiasis occurring in people who were born in St. Lucia, and who have left its shores.

I examined recently 300 slides of blood taken at night, in order to form a reliable estimate of the prevalence of Filaria Nocturna in our midst. Of these 95 were from natives of the island, and 3 only contained Filaria Nocturna, or 3·1 per cent. Ninety-nine slides were taken from coolies, and only two had Filaria Nocturna (or 2 per cent.), whereas of the 106 slides collected from natives of other West India Islands, 14 had numerous specimens of Filaria Nocturna, or 13 per cent. These figures are interesting and instructive, as showing the relative frequency of the disease among creoles and coolies. The coolies, by living by themselves, and more or less apart from the other labourers, are less liable to be inoculated by their neighbours' infected mosquitoes. Probably the patois-speaking St. Lucian derives a certain amount of immunity in the same way, as he does not mix very freely with the English-speaking immigrants from other islands. However, the fact remains that an average of about 3 per cent. St. Lucians are the hosts of Filaria Nocturna, whereas 13·2 per cent. of our neighbours are infected with this blood-worm.

The study of Filaria Demarquaii continues to prove even more interesting than that of the larger worm Filaria Nocturna, on account of its comparative rarity, having been found only in St. Vincent, St. Lucia, and recently in Dominica by Dr. Low. Filaria Demarquaii has another peculiarity, for not only is its presence confined to a few of the islands, but the area of its distribution in these islands is limited practically to one village, or small portion of a district. This fact was noticed by me years ago, as I only found Filaria Demarquaii in the blood of natives of the small fishing village of Gros-Islet, or its immediate neighbourhood, although I inspected hundreds of blood slides from persons living in different districts of the island.

Another fact elicited from my recent examination of the 300 slides mentioned above was that 13 out of the 300 slides were taken from natives of Gros-Islet and vicinity, and of these 6 had good specimens of Filaria, Demarquaii. This gives an average of 46 per cent. who are infected with Filaria Demarquaii at Gros-Islet, which is probably not above the mark. One Filaria Demarquaii subject, out of the 300 slides examined, occurred in a resident of Castries. Not a single embryo was found in the blood of people from other islands.

I have now some 200 slides containing specimens of Filaria Demarquaii, all of which have been taken from residents of Gros-Islet Village.

In my Official Report, dated 27th March, 1900, I described the parental forms of the different varieties of Filaria Sanguinis Hominis which had been discovered up to date, and I quoted some notes by Dr. Ozzard, of Demerara, on the parent worm of Filaria Demarquaii, which I found in 1899. In September, 1901, I had the good luck to find some more parent worms in the connective tissue of the peritoneum of a patient whose blood contained numerous specimens of the embryo Filaria Demarquaii. After a prolonged search *five* parent worms were brought to light. I submitted the specimens to Dr. Manson, who very kindly had them examined by Dr. Daniels. They have all proved to be females, so I have still the difficult task before me of finding a male worm. I sent Dr. Manson a long description of my valuable "find," but as this may some day be published in another form I will not reproduce it here. Dr. Daniels had photographs of the tail of one of my worms taken. He also compared these worms with the parental form of the sharp-tailed Filaria Ozzardi, of British Guinea, which he discovered. He has come to the conclusion that my specimens differ materially from the adult female he found in British Guinea, particularly in the "cuticular thickening at the tip of the tail, as well as in the size and shape of the head." This, then, apparently tends to establish the important point that Filaria Ozzardi, sharp-tailed variety, and Filaria Demarquaii are separate and distinct species, although the embryos of both when seen in the blood resemble each other so

closely and minutely as to be practically indistinguishable one from the other.

Sierra Leone.

PREVALENCE OF MALIGNANT DISEASE AMONG NATIVES.
By Dr. RENNER, *Assist. Col. Surgeon.*

Included in the major operations were a case of cancer of the breasts and epithelioma of the lower lip. I was induced by the occurrence of these cases to consider and endeavour to give a satisfactory answer, so far as this Colony and its Protectorate are concerned, to the oft-repeated questions, "Does cancer occur in native races resident in the tropics?" "Is sarcoma known?" With this view, rather than draw any deduction from my memory of cases seen during the large intercourse I have had with natives of all classes from all parts of the Colony and Protectorate, I have carefully searched into the register of intern patients of this hospital from the year 1870 to 1900, a period of thirty years.

Throughout my search I found that in the column of disease in the register such terms as "malignant growth," "malignant tumour," "carcinoma," "sarcoma," "malignant disease" occur, but without any description of the particular nature of the disease or of the organ or tissue affected.

I have, however, included these terms in my calculation, with the following results. In the decade 1870 to 1879, out of a total of 6,509 patients treated, there were:—2 cases of cancer of the breast, 1 sarcoma, 1 malignant disease of the jaw.

In the period 1880 to 1889, of the 5,334 patients treated, there occurred:—2 cases of cancer of the breast, 2 cancer of the liver, 1 carcinoma, 1 malignant disease.

In the third decade, 1890 to 1899, of 9,092 patients treated there were:—2 cases of malignant growth, 1 case of malignant tumour, 1 cancer of the liver, 1 epithelioma.

If to this period be added the 1,218 patients treated in 1900, and amongst whom were—1 case of epithelioma of the lower lip, 2 cases of scirrhus of the breast, 1 cancer of the pancreas, there would be for the period 1890 to 1900, 10,610 patients treated, including:—1 epithelioma of lower lip, 2 cases of malignant growth, 2 cases of malignant tumour, 1 epithelioma, 1 cancer of the liver, 2 scirrhus of the breast, 1 cancer of the pancreas.

Tabulating the periods under review, the proportion of disease of a malignant nature shows prominently to all the other disease treated, as follows:—

Year	Total patients treated	Disease malignant
1870—79	6,509	4
1880—89	5,334	6
1890—1900	10,610	10
Total in 30 years	22,453	20

If a large number of cases which were seen in the out-patients' department, but refused admission from fear of being operated upon, besides those seen in private practice and others under the treatment of the Obeahman or Fetish doctors, were reckoned, the number of cases of malignant disease in the above tables would increase considerably.

I have not gone into the records of the Princess Christian Cottage Hospital, but from personal experience I know that its register contains a few cases.

From the particulars given above, I am convinced that an answer can be given in the affirmative to the first question—"Does cancer occur in the native races resident in the Tropics?" but no satisfactory answer can as yet be given to the other question—"Is sarcoma known?" In my search through the register I failed to discover any case of cancer of the uterus recorded, although I have met with cases of that disease in my private practice.

The next question which naturally arises in considering this subject is, "Amongst what section or class of natives do these cases occur?" To this a satisfactory answer, based upon the records, can be given—that they occur amongst the Creoles or descendants of the liberated Africans—Akus, Ebois, and Popos or Mahees, who have adopted the European mode of living, and consume a large quantity of butcher's meat. In the whole register there is not a single case of disease of a malignant nature recorded against the liberated Africans themselves or the natives of the Protectorate—viz., the Mendis, Sherbros, Timinis, Limbas, Susas, and Mandingoe, and I believe if such cases occur amongst these people it would be found that either they are Colony-born or have resided in the Colony for years, and have followed the custom of their civilised brethren in the matter of diet.

These natives, like the liberated Africans from Lower Guinea, live simply and largely on farinaceous food and fruits. In this connection it is interesting to note that Sir Wm. Banks, of Liverpool, in his lecture before the Medical Society of London on "Cancer of the Breast," concludes as a result of his researches that the increase of cancer in England is due to the more general consumption of butcher's meat, the use of which, he says, has increased during the last thirty years. I believe that the natives of this Colony, as a result of European civilization, are becoming large consumers of meat, the demand for which is more and more on the increase; that, consequently, malignant disease, which is at present rare, will become more prevalent during the present century.

New Drugs.

CRYOGENINE.—What is termed Lumière's Cryogenine is stated to be an antipyretic and antithermic drug of great energy. It is a crystalline, white, odourless and almost tasteless powder, soluble in 2 parts to 100 parts water, 5 parts in 100 of glycerine, and readily soluble in alcohol. It is recommended in fevers of all kinds, but in the pamphlet we have received malaria is not mentioned. The dose is from 50 to 120 centigrammes ($7\frac{3}{4}$ to 18 grains) and upwards for an adult, and it may be exhibited as wafers, cachets, compressed tablets, or in a jelly. Begin with a large dose, and after 24, 36, or 48 hours repeat in smaller

quantity. The drug causes no deleterious effects, and its use can be continued without danger. Although not a sudorific, we should be glad to have the experiences of medical practitioners in the Tropics as to its efficacy in malarial and other tropical febrile conditions.

Correspondence.

TO THE EDITOR OF THE "JOURNAL OF TROPICAL MEDICINE."

DEAR SIR,—With reference to your Editorial remarks on the question of rheumatism in hot countries, it must be admitted that acute rheumatism is rare, if not unknown. Personally, at least, I have never met with a case; but cases of what we should have called in my old student days "subacute" rheumatism are by no means exceptional, either in natives or Europeans in India, though, of course, you may meet with fifty cases in London where you would find one in Lucknow. Muscular rheumatism, on the other hand, is quite as common with us as in England, especially in the forms of lumbago, sciatica, and pleurodynia. If not quite as common, too, as in the cooler parts of the world, rheumatoid arthritis is extremely prevalent. Perhaps the finest set of specimens of the deformities of the skeleton produced by this disease that I have ever seen were shown me the other day in Liverpool, and the bones in question were those of Egyptian mummies, so that we need not be surprised at finding this disease recorded from our tropical colonies.

Byfield, Mannamead,
Plymouth,
December 5th, 1904.

G. M. GILES,
Lieut.-Col. I.M.S. (*Rtd.*).

Notes and News.

INFANT MORTALITY IN JAPAN.—According to reliable information, the death-rate amongst infants in Japan is said to be lower than it is in Europe. This is assigned to three causes. (1) The houses are built so that the ground-floor is one or two feet off the ground. (2) The house is maintained in so open a condition that the air inside is as fresh as the air outside. (3) The daily use of baths and general cleanliness.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Cholera.

Russia.—Bakou: October 5th to 12th, fresh cases 26, deaths 19.

Astrakhan.—October 5th to 13th, fresh cases 15, deaths 6.

Saratov.—October 11th to 17th, fresh cases 10, deaths 5.

Turkey in Asia.—October 17th to 24th. Mesopotamia, fresh cases 56, deaths 55 (including 5 cases and 6 deaths at Bagdad, and 3 cases, 3 deaths at Mendelli). Since August 30th, cases 40 and deaths 40 at Kattar. Later intelligence indicates a fresh outbreak at Suleymanieh.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE *will be pleased, when possible, to send, on application, the medical journals in which the articles appear.*

"Journal of the Malay Branch of the British Medical Association."

Session 1903-1904. Singapore: Kelly and Walsh, 1904. New Series, No. 1. Price 1 dollar.

Abstracts from Articles appearing in the Journal.

DR. KIRK'S ARTICLE ON LOCAL FEVER.

(*Continued from page* 379.)

Tubercle of the Lung.—This variety of tubercle is rampant among the native population, and in connection with this enquiry I would like to point out that in this climate its physical symptoms and signs are often marvellously latent. An afternoon temperature with a general malaise are often the only symptoms complained of, and the condition is frequently diagnosed as chronic malaria, or as an example of some mysterious undescribed fever.

Hepatitis.—As all tropical practitioners know, liver suppuration in many of its forms is extremely hard to diagnose. Such cases are frequently taken for malaria or typhoid, often for the latter. This condition is not common among the Chinese, but is frequently met with among the Indian population. It is unnecessary to point out the signal help which a blood examination affords these cases. There is almost invariably a leucocytosis or a relative increase in the polynuclear leucocytes.

Appendicitis.—Is not uncommon among natives in this community, especially in certain classes, and presents often the features of a quotidian malaria or a typhoid. The abdominal symptoms may be much masked and hard to elicit, and one is led off the track very frequently.

Other Septic Infections.—From this point of view general gonorrhœal infections are most important. Venereal disease has been since the repeal of the C. D. O. Acts rampant among the Chinese population, and gonorrhœa here, as elsewhere in the world, claims its usual holocaust of victims, innocent and otherwise. One frequently meets with a form of chronic pyrexia often accompanied by arthritic symptoms; if these are prominent the diagnosis is easy, but often the physician is led astray till an enquiry as to the condition of the urethra reveals the presence of a subacute prostatitis or gleet.

Blood and Intestinal Parasites.—One has to mention here:—

(1) The fever accompanying filarial infection, which is very common.

(2) Relapsing fever.—This condition I have not yet diagnosed in my practice here.

(3) Trypanosomiasis has not yet been met with in this quarter of the world, as far as I know.

(4) Ankylostomiasis.—This condition is undoubtedly widely spread, and is responsible for a large amount

of sickness and mortality, especially among the coolie class. A chronic febrile condition is often a main symptom of this infection. The disease is rarely diagnosed, owing to the neglect of a systematic examination of the fæces.

Unclassified Fevers.—I have been on the look out for Malta fever, and have used the serum reaction in several doubtful cases, but without any success. More extended and scientific researches than mine will probably elicit its presence here, but I cannot believe that it exists to any extent, or is of any importance in the elucidation of our sickness and mortality record.

In conclusion, I must apologise for the unsatisfactory and fragmentary nature of the preceding paper. It is merely the small and limited contribution of a general practitioner in a tropical city towards the study of a much debated subject.

Results of Necropsies on Cholera Cases. By John Catto, M.B.(Aberd.), late Resident Medical Officer St. John's Island Quarantine Station.

Post-mortem examinations were made on sixty-three cases. Two died of pyæmia following purulent pleurisy and pneumonia. One of these had a stricture of the urethra. Three died of debility after formed stools had been passed. Purulent pericarditis and perforating peritonitis from old dysenteric ulceration accounted for the death of two more, while the remaining fifty-six (56) died directly from cholera.

The conditions of the respective organs were as follows:—

Heart.—The left ventricle was almost always contracted, although never quite empty. The other cavities were dilated with dark fluid blood with very small black threads of blood clot. In two cases, when the section was made about twenty minutes after death, the left ventricle, as well as the other cavities, was distended with dark chocolate-coloured blood. The aortic epicardium was very often injected.

Lungs.—In most cases where no organic disease of the lungs existed the pleural cavity was dry and sticky, while the lungs, small, collapsed, and pale grey in colour, lay in the posterior angle of the ribs. A possible explanation of this may be found in *post-mortem* rigidity of the lung and heart muscle.

The *liver, spleen, and kidneys* were congested. The bladder, in cases dying during the cold stage, was nearly, never quite, empty. In cases recovering from this stage a variable amount of urine was found. The *suprarenal capsules* were dry and sticky. The *pancreas* itself was not appreciably altered, although its superficial veins were much distended with blood.

Bowel.—The condition of the bowel varied a great deal. Usually the stomach was a very pale grey, while its vessels seemed picked out by injection. Sometimes this organ had superficial slight ulceration of the mucous membrane. The small intestine had its peritoneal coat cream-coloured, dry, and sticky, with a rose-pink injection of its vessels in 13 out of 56 cases. In 5 cases the lowest foot of the ileum was acutely congested. In the remaining 30 cases the peritoneal coat was dull grey-blue in colour. Perhaps the time of making the *post-mortem* cases had to do with this. The mucous membrane in 5 cases was acutely congested. In the other cases it had a sodden, dull red appearance. The mucous membrane of large intestine in many cases showed signs of previous attacks of dysentery, while its peritoneal coat often showed the injection of its vessels. In three cases were noticed small pin head, velvety thickenings of mucous membrane inappreciable to the touch in the lower 2 feet of the ileum. The contents of the intestines varied, and were as follows:—

(*a*) The commonest material found was of a thick syrupy consistence with a yellow-white to yellow-brown colour, and seem to be preliminary to rice-water stools.

(*b*) Rice-water stools came next in frequency.

(*c*) A chocolate-brown broken down curd suspended in a dirty watery liquid.

(*d*) Pea soup fæcal stained matter.

One case had been passing rice-water stools, and formed fæces were found in the large intestine.

Cholera bacilli were not always found.

Notes of a Case of Hæmoglobinuric Fever in Selangor, Malay Peninsula. By Malcolm Watson, M.D.(Glas.), D.P.H.(Camb.), District Surgeon, Klang, Federated Malay States.

F. V. W., Eurasian, aged 26, a dresser in Klang Hospital, has been stationed in the coast districts for the past two years, first at Jeram, then at Klang, again at Jeram, and for a few months previous to passing hæmoglobin, at Klang. He has had repeated attacks of malaria, but paid little attention to them, taking quinine only when his temperature was up.

On July 14th, 1903, he was attacked by fever, but there was nothing unusually severe about it. On the following two days, in spite of quinine sulph. grs. x. twice daily in solution, there was little improvement, but on the 17th he felt much better, and his evening temperature was only 99·6°. That night, however, it rose suddenly to 105·4°. He had severe headache, and repeatedly vomited greenish material. There was no diarrhœa nor looseness of the bowels.

He had 10 grs. quinine at 7.15 a.m., July 15th.

At 1 p.m. he passed very dark-coloured urine, a specimen of which was sent to the Institute for Medical Research. At the same time he felt severe pain over his loins and some pain over his bladder.

July 19.—From 10 a.m. to 6 p.m. (18th) he passed only 4 ozs. of dark urine, and from 6 p.m. to 6 a.m. (19th), 24 ozs. urine. His temperature rose to 104·6° at noon on the 18th, but rapidly subsided.

His quinine was stopped and he was given nothing throughout the day except milk, chicken soup, and barley water.

July 20.—He has slept well; looks better. The urine is still red coloured, but brighter in colour; 46 ozs. have been passed in the twenty-four hours.

July 21.—Urine is noted as amber colour, pain in loins is practically gone.

July 25.—Since the last note the urine has been passed in fair quantity, 40, 35, 34, 40 ozs. daily. Urine sp. gr. 10·25, amber coloured, faintly acid. No albumen, or sugar, white deposit of ammonia, mag. phos. and a carbonate (effervescing with acids). No tube casts. Urine had stood for six hours.

He had been taking no drug but quinine prior to the

attack. After the dose of quinine on the 18th he had no drug until the 24th, when he was put on to a mixture of iron and arsenic.

Dr. Daniels, Director of the Institute for Medical Research, who kindly examined the urine, reported that "the urine contained in solution hæmoglobin and methæmoglobin, that no red corpuscles were found, and there was no bile. There were casts. In these characters the urine was similar to that of a mild case of African blackwater fever. The history of the case in essential features is similar to some of the cases of that disease."

After a two months' holiday the patient returned to duty, strong and well. His urine is normal, and he has had no return of the fever up to the present date (Dec. 15th, 1903).

Piedra.

Lombardo Cosimo. *Giorn. Ital. d' Mal. Ven: e della Pelle Fasc.* iii., 1904.

In 1876, Osorio of Bogota, described an alteration in the hair, fairly common in Columbia on the hair of women, but exceptional on the hair of men, consisting of a whitish nodosity, hard, of variable size and disposition, which he believed due to the concretion of cells of the hair. The disease is commonly known as piedra (stone) on account of the consistence of the nodes and from the crepitation when a comb passes over the affected hairs. Two years later Desenne, in hair from Columbia affected with piedra, found nodes formed of spores 12-15 μ, strongly refractile, colourless, with articulated filaments, irregularly scattered outside the hair. Analogous nodular lesions were found in Europe by Knoch in Russia in 1866, Lindermann in 1867, and Beigel in 1869 in England, on the hair of wigs and the hair of patients. Lindermann described similar formations in gregarin. Beigel not only found masses of fungi measuring 4·7 μ, but succeeded in cultivating a filamentous fungus, which he called chignon fungus, on account of the frequency with which it was found in wigs and chignons. Cheadle and Morris, *Lancet*, 1879, describe under tinea nodosa, a case of piedra met with in England, affecting the beard and whiskers. Behrend, in 1890, described a lesion in the whiskers of a colleague, compared it with hair from Columbia, cultivated the two parasites in similar media; but the cultures did not produce pure mycelium. He called the isolated fungus *Trichosporon ovoide*, considering that it lived on the hair from nutriment supplied from without, not admitting direct contagion. Juhel-Rénoy and Lion (*Trans. Dermit. Syph.*, 1890) isolated a fungus from Columbian hairs and produced a characteristic growth on many media. Five per cent. gelatine was fused in ten to twelve days, the resulting growth consisted of spores and filaments variously disposed, of different forms and dimensions; also the spore was formed by superficial segmentation, or directly by the growth of the spore itself; they found no other organ of fertilisation, and they classed it in the genus *Dematium*. Unna, in 1895, proposed the name of *Piedra nostras* to distinguish it from the South American variety, *Piedra columbica*.

In a case observed in Germany affecting the whiskers, the spores were 9 μ and rapidly liquefied gelatine. From the predominant form of spore he called the fungus *Trichosporon ovale*. The last case described is that of Vuillemin met with at Nancy. Schächter, in his thesis on this case, specially describes the regular arrangement of spores in the concretions which were attached to the cuticle of the hair, was unable to produce the lesion on animals; the spore was 2-5 μ; the culture on gelatine did not cause liquefaction. In an article on the same case Vuillemin compared the parasite with the one isolated by Beigel, and proposed to classify all the spore-producing spores by division at hyphæ in a special group, calling Trichosporon those which live outside the hair, classing them as follows:—

Trichosporon	giganteum	(Piedra Columbiani)
,,	Beigeli	(Vuillemin, Schächter)
,,	ovoide	(Behrend)
,,	ovale	(Unna)

differentiating by the size or shape of the spores and by their growth on gelatine, changing the name from piedra to Tricosporie.

The following are the first cases described in Italy, and are important from the pathogenesis, biology, and classification of the parasite.

Case I.—Labourer, aged 29, came for trouble in the whiskers; he had noticed for some months that the hairs came out, felt rough and of altered calibre. Both his whiskers were thick, long, black, with strong hairs that appeared unbroken. Careful examination of the middle part, while of a normal colour, showed the slight alteration described by the patient with moisture from the condensation of the vapour of respiration. In addition the patient had diffuse pityriasis of the glabrous skin of the face, of the upper lip, of the eyebrows, of the scalp, and on the lobes of the ears furfuraceous desquamation. The skin was slightly red with small thin dry scales easily removed. The patient sometimes had considerable itching and desquamating areas.

Case II.—Porter, aged 40, came for urethritis, did not complain about his whiskers, which were thick, long, brown coloured, dry at the sides, of a lighter colour at the central parts, moist, broken off at 3-4 cm., of variable thickness and rough to the touch. Examination of the hair when placed on a white surface showed (1) a concretion of a brown colour all round the hair like a muff, rough from little nodes varying in number. (2) The concretions doubled the thickness of the hair, and started some millimetres from the bulb, increased in the middle part and were more scattered at the ends. (3) The broken ends of the hairs were thickened. (4) The nodes were hard and firmly adherent. (5) They rarely presented the appearance of trichorrhexis, for they were not altered in structure and fairly well resisted traction. Alcohol and ether whitened the concretions by removing fat and extraneous matter.

Under a low power the hairs were more or less covered with a strongly refractile substance, granular, transparent, so that the unaltered outline of the hair could be seen. Round the hairs the covering of unequal thickness, lumpy, with clefts between so as to form bosses more or less large and raised. On re-

moving the concretion the surface of the hair was unaffected, the cuticle was unbroken and not depressed. Under a higher power the surface of the concretions resembled a mosaic of elements of various sizes, the shapes being due to mutual pressure, the substance of the concretion is formed by the same elements. At the margins there are in thin strata here and there raised filaments extended from and spreading over the surface from the nodes outside the hair, forming a network with long meshes, the interspaces appearing free from parasites on superficial examination of untreated hairs. These filaments are formed partly of branches arising at right angles, partly of spores. The filaments invade as groups of spores, though not always. Stained specimens show these filaments to be on the cuticle and to be superficial to the hair. With caustic potash the nodes soften so that slight pressure on the cover slip causes them to spread in a thin layer, showing numerous spores of various shapes and sizes, mostly oval; these are somewhat resistant to the action of potash, which makes them swell. Many other shapes are seen, all have a refractile centre with a capsule or external membrane which is not easily seen without special staining. The spores measure 4-5 μ, the largest are in contact with the hair as if pressed on it. The filaments measure 30-50-70 μ, formed of unbranched tubes with articulations 7-10-15 μ, some ending in swellings. These are most numerous at the periphery of the nodes and some of these are prolonged to the mycelium, independent of the nodes.

Other cocci and bacilli are found on and in the nodes. Joining the cuticle of the hair are numerous cells firmly adherent, accounting for the firm adhesion of the concretions. Some authors consider the adhesion is due to a special mucilaginous or gelatinous substance. Special staining shows the cuticle unaffected. Longitudinal or transverse sections show that neither the medulla nor cortical part contain either spores or mycelium, it is only from the cuticle that spores can be obtained. Once only was the medullary canal seen to be occupied for one or two mm. by spores, identical with those outside, in a small concretion with which there was no evident communication. The cells, easily separated by maceration of the hair, by prolonged moisture have received the first invasion of the fungus. These scales are like metallic armour on a wall on which the spores are like bricks, so as to incrust the hair and increase its thickness. Sections show the linear disposition of the spores perpendicular to the hair. The elements of the fungus and its arrangements were identical in the two cases, although less marked in the second. The first case had intense dry pityriasis of the face and scalp. The scales from various parts treated with alcohol, ether, and then acetic acid, evaporated at 51° and coloured as before. From the corneous cells, some of which had stained nuclei, there were numerous cocci of various sizes, many spores of Malassey (bottle bacilli of Unna) and elements corresponding in size and colour and reaction to those found on the hair; round and oval spores with a special capsule, coloured deep red by polychrome blue, fragments of filaments with two or more joints and a terminal swelling. There was no trace of microsporon furfur. Culture of the scales gave identical results to those of the hair. In the scales the fungus was scarce, but sufficient to account for the pityriasis.

CULTURES.

Of the scales from the first case one in three successful cultures were made from the upper lip or eyebrows, less from the other parts of the face, none from the scalp.

On agar glycerine, gelatine, broth, milk, milk agar, potato, carrot, the fungus grew rapidly, but slowly on egg.

"British Medical Journal," November 26, 1904.

(1) Remarks on Trypanosome Diseases. By Professor Robert Koch, M.D.

(2) Tick Fever. By Philip H. Ross, M.R.C.S., L.R.C.P., and A. D. Milne, M.B., C.M.Aberd. (with charts).

(3) Note on the *Rôle* of the Horse-fly in the Transmission of Trypanosoma Infection, with a reply to Colonel Bruce's Criticisms. By Captain Leonard Rogers, M.D., M.R.C.S., I.M.S.

(4) Trypanosomiasis in the Anglo-Egyptian Soudan (Preliminary note). By Andrew Balfour, M.D., B.Sc., M.R.C.P.Edin., D.P.H.Camb., Director, Wellcome Research Laboratories, Gordon College, Khartoum.

(5) Sleeping Sickness (Trypanosomiasis), the Prevention of its Spread and the Prophylaxis. By Cuthbert Christy, M.B., C.M.Edin.

(1) REMARKS ON TRYPANOSOME DISEASES.

Koch, in his remarks, states that the trypanosomes belong to the flagellata, the ciliated protozoa. They resemble a fish in general outline; they are twice or three times as long as a red blood corpuscle and possess a long flagellum, and on one side an undulating membrane. When stained by Romanowsky's method (Giemsa's modification) the following characteristic features can be noted: (*a*) a red-stained nucleus; (*b*) a granule close to the hinder end stained deeply red, looking like a centrosome; (*c*) a red-stained line issuing from the granule and extending to the edge of the (*d*) undulating membrane, which passes into the flagellum; (*e*) the body shows blue owing to the staining of the plasma.

Trypanosomes, unlike malarial parasites, do not live at the expense of the hæmoglobin, but upon the constituents of the blood plasma. They multiply by longitudinal fission. The symptoms occasioned by the presence of trypanosomes in the blood resemble those of malaria, with which the disease is frequently confused.

The trypanosomal diseases mentioned by Koch are: tsetse-fly disease, surra, mal-de-caderas, sleeping sickness, the *Trypanosoma Theiler* (affecting cattle in South Africa), and the rat trypanosome. The two last-mentioned, the Theiler and rat trypanosomes, are distinct, inasmuch as they are constant, their virulence shows no variation, they each show the same characteristics when inoculated, the rat parasite multiplying in rats, and can only be passed on again to rats; Theiler's trypanosome multiplying in cattle, and can be passed on to no other animal but cattle. All other trypanosomes in man and animals are fluctuating and variable, they are not sharply separated morpho-

logically from each other, their virulence fluctuates over a wide range, and they are not exclusively found in one host.

In regard to prophylactic measures, action might be taken either against the intermediary, the stinging fly, or the parasites themselves. Little is really known of the stinging flies in any part of the world except the glossinæ in Africa. In connection with these it is to be noted that with the disappearance of big game in any district, so the tsetse-fly disappears, so that it would seem that a good stock of game and a good stock of cattle cannot exist in one locality. When trypanosomes are found to be present amongst animals, all should be examined, and the infected animals slaughtered or kept so that they cannot infect other cattle until slaughtered. All suspected animals should be sent to places where there are no stinging flies, or to a neighbourhood where no other cattle are. There is no specific drug for trypanosomiasis, but trypanroth and arsenic combined have been favourably mentioned. Malachite green is also said to destroy trypanosomes in the blood of animals experimented upon.

(2) Tick Fever.

Marchaux and Salimbeni showed recently that ticks convey spirillary disease in fowls, and a tick fed on an infected fowl can transmit the disease to other fowls for a period of at least five months.

Drs. Hodges, Ross and Milne, working at tick fever in Uganda, have made investigations as to the presence of the spirillum in the tick fever of man, and have come to the conclusion that certain cases of illness diagnosed as tick fever are due to a spirillum; and it seems probable that the disease is inoculated by the bite of infected ticks.

The period of incubation of tick fever seems to vary from one to five or more days. The signs and symptoms are: pains in the occipital region of the head, pains in back and limbs, vomiting, diarrhœa in almost half the cases, cough in some cases, and sometimes splenic tenderness; skin hot and dry, congested conjunctivæ, tongue mottled, with slight yellow fur; no enlargement of liver or spleen. All patients suffering from tick fever recovered.

(3).—Rôle of the Horse-fly in the Transmission of Trypanosoma.

The tsetse-fly is known to be the carrier of the infection of nagana in South Africa, but the medium of transmission of trypanosomal diseases in other parts of the world is not yet definitely settled. Lingard found trypanosomes in certain horse-flies which had fed on surra animals in India, as long ago as 1898, and Leonard Rogers in 1899 succeeded in transmitting the parasites from infected animals, by means of horse-flies, to dogs and rabbits. Shilling, in 1902, experimenting in Togo, shows that at least two species of flies can transmit the infection in dogs. Curry, in Manila, found *Stomoxys calcitrans* to be the principal agent in the transmission of the disease among horses. Sivori and Lecler, in South America, proved that the *Musca brava*, the *Stomoxys calcitrans*, and the *Taon* can transmit the disease from horse to horse. Musgrave and Clegg, Manila, sum up their conclusions, arrived at after a series of experiments, as follows:—

"Trypanosomiasis is essentially a wound disease, and infection takes place when the *materies morbi* are brought into contact with an injured surface, and in no other way. The most common agents in bringing about this condition are biting and stinging insects, and of these certain flies, and to a less extent fleas, are the most important."

Rogers therefore concludes that other flies besides tsetse-flies can carry the trypanosoma infection, of which horse-flies are the most important in the case of surra. These observations seem to point to the possibility of the occurrence of human trypanosomiasis in other countries besides Africa, for biting insects, other than tsetse-flies, appear capable of conveying infection from man to man and from animals to animals.

Rogers refutes Colonel Bruce's criticisms on the methods by which he (Rogers) arrived at his conclusions.

(4) Trypanosomiasis in the Anglo-Egyptian Soudan.

Balfour, in a preliminary note on the subject, states that he found trypanosomes in the blood of a donkey from the Bahr-el-Ghazal province. The parasites were also found by Head and Christopherson in the blood of a mule from the same region. Head also found trypanosomes in the blood of cattle from the Shilluk district of the Soudan. The tsetse-fly—*Glossina morsitans*—is met with in the Bahr-el-Ghazal district; but the *G. palpalis* has not so far been found, nor has trypanosomes been met with in human beings. In the Northern Soudan Balfour failed to find trypanosomes in bats, mud fishes, small birds and mammals which he examined.

(5) Sleeping Sickness (Trypanosomiasis).

Christy criticises the rules issued by the Government in British East Africa for the prevention of the spread of sleeping sickness. He is of opinion that the quarantine and medical inspection methods adopted against plague in India—which the East African prophylactic measures closely resemble—are unsuitable in Africa against sleeping sickness. Christy argues: (1) Sleeping sickness has an incubation period varying from a few months to probably several years; (2) the symptoms of invasion are very obscure, the patient being but slightly indisposed for a period of weeks, or even months; (3) the early diagnosis of sleeping sickness is difficult, requiring much labour and technical skill; (4) Africa is a network of pathways impossible to watch; there are no main channels of communication by rail, road, canals or caravans. For all these reasons, therefore, preventive measures, based on examination and segregation of travellers, is an impossibility in East Africa. Christy believes that the evacuation of certain tsetse-fly-infected districts would be a most certain prophylactic measure, and as the fly cannot exist more than a short distance from water, the area disturbed would be limited. Were this area uninhabited for seven years the people might be allowed to return. But the exact area infected by tsetse-flies is not exactly known, and Christy argues that before anything can be attempted, the first

requisite is to map out exactly the region inhabited by the *G. palpalis*, when, if evacuation is not decided upon, men, animals and houses in the infected area might be protected from the bites of the tsetse-flies by gauze or wire netting.

Literary References.

TROPICAL DISEASES.

UNCINARIASIS.

Ankylostomiasis: a Skin Infection, *Brit. Med. Journ.*, 1904, vol. ii., p. 852.

Ashford, B. K., and **King, W. W.** Notes and Observations on Uncinariasis in Porto Rico, *N. Orl. M. and S. J.*, 1903-4, vol. lvi., p. 651.

Austregesilo, A. Infestacão da ankylostomiasis pela pelle, *Brazil med.*, Rio de Janeiro, 1903, vol. xvii., p. 447.

Baroni, G. Tre casi die anchilostomiasi, *Gaz. di osp.*, Milan, 1904, vol. xxv., p. 750.

Behrendt. Ankylostomiasis, *Strassb. med. Ztg.*, 1904, vol. i., p. 35.

Bentley, C. A. Some Notes on Ankylostomiasis in Assam, *Indian Med. Gazette*, Calcutta, 1904, vol. xxxix., p. 135.

Bourget [un cas d'ankylostomum duodenale], *Rev. med. de la Suisse Rom.*, Genève, 1903, vol. xxiii., p. 523.

Boycott, A. E. Great Britain. Secretary of State for the Home Department. Report on the Diagnosis of Ankylostomia Infection, with Special Reference to the Examination of the Blood, London, 1904, Darling and Son, 12 pp., folio.

Boycott, A. E., and **Haldane, J. S.** An Outbreak of Ankylostomiasis in England, *Journ. Hyg.*, Cambridge, 1903, vol. iii., p. 95; 1904, vol. iv., p. 73, 6 pl.

Branch, C. W. Treatment of Ankylostomiasis, *Brit. Med. Journ.*, London, 1904, vol. i., p. 545.

Bruns, H. Die Bekämpfung der Wurmkrankheit (Ankylostomiasis) im rheinischwestphälischen Ruhrkohlenbezirk. *München. med. Wchnschr.*, 1904, vol. li., p. 657.

Versuche über die Einwirkung einiger physikalischer und chemischer Agentien auf die Eier und Larven des Ankylostoma duodenale, nebst Bemerkungen über die Bekämpfung der Krankheit im Ruhrkohlengebeit, *Klin. Jahrb.*, Jena, 1904, vol. xii., p. 1.

Ueber Ankylostomiasis, *München. med. Wchnschr.*, 1904, vol. li., p. 1029.

Calhoun, A. W. The Association of Cataract with Uncinariasis or Hook-worm Disease, *Ophth. Rec.*, Chicago, 1904, vol. xiii., p. 145.

Chronnell, J. Ankylostomiasis, *Lancet*, London, 1904, vol. i., p. 1419.

Cima, F. Un caso di anemia da anchilostomiasi ed anguilula intestinalis, *Pediatria*, Napoli, 1904, 2 s., vol. ii., p. 418.

Codina. Anquilostomicasia en España, *An. r. Acad. de med.*, Madrid, 1904, vol. xxiv., p. 152.

Combe. Un cas d'anémie pernicieuse par ankylostome duodénal, *Rev. méd. de la Suisse Rom.*, Genève, 1903, vol. xxiii., p. 269.

De Conciliis, D. Uncinariasi (anchilostomiasi), *Ann. di med. nav.*, Roma, 1904, vol. i., p. 51.

Dieminger. Beiträge zur Bekämpfung der Ankylostomiasis, *Klin. Jahrb.*, Jena, 1904, vol. xii., p. 123.

Dopter. Ankylostomiase; sur répartition géographique; ses symptômes; son étiologie, *Gaz. d. hôp.*, Paris, 1904, vol. lxxvii., p. 817.

Fabre, P. Causes et prophylaxie de l'anémie des mineurs, *Bull. Acad. de med.*, Paris, 1904, 3 s., vol. li., p. 312.

García de Quevedo, L. Uncinariasis ó ankilostomiasis con la historia clinica de un caso, *Bol. Asoc. med. de Puerto-Rico*, San Juan, P. R., 1903, vol. i., p. 141.

Gelbke. Ueber Ankylostomiasis, *München. med. Wchnschr.*, 1904, vol. li., p. 280.

Goldman, H. Zur Therapie der Ankylostomiasis-Anämie, *Deutsche Aertze-Ztg.*, Berlin, 1903, p. 559.

Great Britain. Home Office. Memorandum on the Mode of Detection of the Ovum of Ankylostoma duodenale (miner's worm), London, 1904, Darling and Son, 4 l., 1 pl., 4to.

Harrison, W. G. Observations on the Blood and Circulation in Uncinariasis, *Med. News*, New York, 1904, vol. lxxxv., p. 641.

Henry, J. N. Two Cases of Uncinariasis, *New York Med. Journ.*, &c., 1904, vol. lxxx., p. 59.

Herman, M. Contribution à l'étude du traitement de l'ankylostomasie, *Scalpel*, Liége, 1904-5, vol. lvii., p. 18.

La conférence de Cologne sur l'ankylostomasie, *Scalpel*, Liége, 1904-5, vol. lvii., p. 82.

Hewlett, R. T. Ankylostomiasis, *Journ. State Med.*, London, 1904, vol. xii., p. 48.

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